

PUBLIC HEALTH NURSING: WHAT DIFFERENCE DOES IT MAKE FOR PRIORITY  
PERINATAL WOMEN?

by

Mary Eleanor Hill

B.Sc.N., University of British Columbia, 1976

M. Ed., University of Victoria, 1992

A Dissertation Submitted in Partial Fulfillment of the  
Requirements for the Degree of

DOCTOR OF PHILOSOPHY

In the School of Nursing

© Mary Eleanor Hill, 2017  
University of Victoria

All rights reserved. This dissertation may not be reproduced in whole or in part, by photocopy or other means, without the permission of the author.

PUBLIC HEALTH NURSING: WHAT DIFFERENCE DOES IT MAKE FOR PRIORITY  
PERINATAL WOMEN?

by

Mary Eleanor Hill

B.Sc.N., University of British Columbia, 1976

M. Ed., University of Victoria, 1992

**SUPERVISORY COMMITTEE**

Dr. Marjorie MacDonald, Supervisor

School of Nursing

Dr. Lenora Marcellus, Departmental Member

School of Nursing

Dr. Elizabeth Borycki, Outside Member

School of Health and Information Science

## **Abstract**

The purpose of this study was to investigate how routine, day-to-day public health nursing (PHN) practice in one BC health authority affected health outcomes related to breastfeeding initiation and duration, infant immunizations, and household tobacco use within the population of perinatal women who were a high priority for additional and ongoing PHN services. Using administrative data from the integrated public health information system (iPHIS), outcomes for the priority population were compared to those of the general population of new mothers receiving usual PHN services. Additionally, through semi-structured interviews with PHNs, this study explored how the context of the work environment influenced PHN practice, and ultimately the achievement of those outcomes. Based on a philosophical foundation of critical realism, and a theoretical framework of critical caring, a mixed methods case study design was used to study PHN practice, as it existed day-to-day, amidst the array of ever changing organizational influences.

Results from the statistical analysis of administrative data and thematic analysis of PHN interviews and organizational guiding documents, showed that priority women, who received five or more postnatal contacts from PHNs initiated breastfeeding in higher proportions than non-priority women, and continued breastfeeding to 18 months in the same proportion as non-priority mothers. Rates of breastfeeding duration for priority women were higher than expected based on current literature. Children of priority mothers were fully immunized in a slightly higher, but not significantly different proportion than children of the non-priority population, also at rates higher than expected. Although high rates of household tobacco use among this group of priority women did not appear to be influenced by PHN contact, the relationships that developed between priority women and PHNs suggest that organizational support for tobacco

cessation activities may be a missed opportunity. Thematic analysis of PHN interviews and guiding documents provided background context and clarification for the kinds of organizational factors and underlying mechanisms that may have influenced the ability of PHNs to provide additional and ongoing support to priority perinatal women in achieving these three outcomes of interest. Finally, the theory of critical caring was verified and extended through the experiences and explanations of PHNs, with the addition of “navigating organizational complexity” to the original seven carative health promoting processes.

Key words: Public health nursing; perinatal; breastfeeding; tobacco; immunizations, administrative data.

## Table of Contents

<b>SUPERVISORY COMMITTEE</b> .....	<b>ii</b>
<b>ABSTRACT</b> .....	<b>iii</b>
<b>TABLE OF CONTENTS</b> .....	<b>v</b>
<b>LIST OF TABLES</b> .....	<b>viii</b>
<b>LIST OF FIGURES</b> .....	<b>ix</b>
<b>LIST OF ABBREVIATIONS</b> .....	<b>x</b>
<b>ACKNOWLEDGEMENTS</b> .....	<b>xi</b>
<b>EPIGRAPH</b> .....	<b>xiii</b>
<b>CHAPTER I - INTRODUCTION</b> .....	<b>1</b>
RESEARCHER STANDPOINT .....	1
BACKGROUND.....	4
<i>The priority perinatal population.</i> .....	6
<i>PHN involvement with priority perinatal women.</i> .....	9
<i>Priority perinatal women as a focus in BC</i> .....	11
<i>The nature of PHN practice.</i> .....	12
<i>Health promotion and population health</i> .....	14
THE PURPOSE OF THIS STUDY .....	15
<i>Using data to assess outcomes.</i> .....	17
<i>Nursing sensitive indicators</i> .....	21
DISSERTATION OUTLINE .....	22
SUMMARY .....	26
<b>CHAPTER 2 - LITERATURE REVIEW</b> .....	<b>27</b>
<i>FIGURE 1. FLOW CHART OF PAPERS SELECTED FOR LITERATURE REVIEW.</i> .....	30
BREASTFEEDING .....	30
<i>Breastfeeding and the social determinants of health.</i> .....	34
<i>The role of PHNs in supporting breastfeeding.</i> .....	38
<i>The perspective of mothers.</i> .....	46
<i>Breastfeeding, priority populations, and PHNs: A Summary.</i> .....	48
TOBACCO.....	49
<i>Tobacco use and the social determinants of health.</i> .....	50
<i>The role of PHNs in tobacco cessation.</i> .....	51
<i>The perspective of mothers.</i> .....	54
<i>Implications for PHNs.</i> .....	55
<i>Community influences.</i> .....	57
<i>Tobacco, priority populations, and PHNs: A summary.</i> .....	59
INFANT IMMUNIZATIONS.....	60
<i>Infant immunizations and the social determinants of health.</i> .....	60
<i>The role of PHNs and immunizations.</i> .....	62
<i>Immunizations, priority populations, and PHNs: A summary.</i> .....	66
SUMMARY .....	68
<b>CHAPTER 3 - THEORETICAL FRAMEWORK</b> .....	<b>74</b>
THE PUBLIC HEALTH NURSING INTERVENTION WHEEL MODEL .....	74

CRITICAL CARING THEORY .....	78
<i>Why is the critical caring theory important to this inquiry?</i> .....	83
SUMMARY .....	85
<b>CHAPTER 4 – PHILOSOPHICAL FOUNDATIONS.....</b>	<b>86</b>
INTRODUCTION TO CRITICAL REALISM .....	86
ONTOLOGY OF CRITICAL REALISM .....	88
EPISTEMOLOGY OF CRITICAL REALISM.....	90
METHODOLOGICAL IMPLICATIONS.....	91
ANALYTIC IMPLICATIONS .....	92
SUMMARY .....	94
<b>CHAPTER 5 – METHODOLOGY.....</b>	<b>96</b>
PART I – CASE STUDY AS A RESEARCH DESIGN .....	96
<i>What is a case study?</i> .....	97
<i>Philosophical foundations of case study</i> .....	98
<i>Type of case study</i> .....	99
<i>Strengths and limitations of case study</i> .....	101
<i>What is my case?</i> .....	102
PART II – MIXED METHODS IN CASE STUDY DESIGN.....	104
<i>What is mixed methods research?</i> .....	105
PART III– DATA COLLECTION METHODS.....	107
<i>Quantitative data collection</i> .....	107
<i>Administrative data use in nursing research</i> .....	107
<i>Qualitative Data Collection</i> .....	120
<i>Interview design</i> .....	123
<i>Guiding documents</i> .....	124
<i>Demographics</i> .....	126
<i>Participant observation</i> .....	127
<i>Reflexivity</i> .....	128
<i>Ethics</i> .....	130
PART IV – DATA ANALYSIS.....	130
<i>Quantitative data analysis</i> .....	131
<i>Qualitative data analysis</i> .....	135
SUMMARY .....	141
<b>CHAPTER 6 - FINDINGS.....</b>	<b>143</b>
QUANTITATIVE RESULTS .....	143
<i>Breastfeeding</i> .....	144
<i>Household tobacco</i> .....	147
<i>Infant immunizations</i> .....	148
<i>Summary of quantitative data findings</i> .....	149
QUALITATIVE RESULTS.....	150
<i>Analysis of themes</i> .....	151
REVIEW OF PHILOSOPHY, METHODOLOGY, AND THEORY .....	186
INTERPRETATION OF FINDINGS .....	186
<i>Breastfeeding initiation</i> .....	187
<i>Breastfeeding duration</i> .....	191

<i>Household tobacco use</i> .....	203
<i>Infant immunizations</i> .....	211
UNDERLYING MECHANISMS .....	214
<i>Shared vision and priorities</i> .....	215
<i>Continuity</i> .....	218
<i>Workplace culture</i> .....	219
<i>PHN Capacity</i> .....	221
CONTRIBUTION TO NURSING KNOWLEDGE .....	224
<i>Verification and extension of critical caring</i> .....	224
<i>PHNs make a positive difference</i> .....	228
LIMITATIONS OF THIS CASE STUDY .....	230
IMPLICATIONS FOR PHN PRACTICE, POLICY, AND RESEARCH .....	232
CONCLUDING REMARKS .....	236
<b>REFERENCES</b> .....	<b>239</b>
<b>APPENDIX A</b> .....	<b>273</b>
KEY RESEARCH ARTICLES SUMMARY TABLE .....	273
<b>APPENDIX B</b> .....	<b>295</b>
ETHICS APPROVAL .....	295
<b>APPENDIX C</b> .....	<b>297</b>
RECRUITMENT POSTER .....	297
<b>APPENDIX D</b> .....	<b>298</b>
PHN PARTICIPANT RECRUITMENT INVITATION .....	298
<b>APPENDIX E</b> .....	<b>300</b>
INFORMED CONSENT FOR PHN PARTICIPANTS .....	300
<b>APPENDIX F</b> .....	<b>304</b>
PHN INTERVIEW QUESTIONS .....	304
<b>APPENDIX G</b>	
CHECK LIST FOR COMPILING EXCEL FILES WITH BCCDC DATA .....	306
<b>APPENDIX H</b>	
RESULTS OF STATISTICAL TESTS .....	313

## **List of Tables**

Table 1 Inclusion and Exclusion Criteria for Literature Review Studies.....	29
Table 2 Data Fields from iPHIS.....	114
Table 3 Guiding Documents.....	126
Table 4 Sample Contingency Table.....	132
Table 5 Summary results for three local health areas combined .....	149

## List of Figures

Figure 1. Literature Review Flow Diagram.....	29
Figure 2. Intervention Wheel.....	75
Figure 3. Critical Caring Theory Model by Falk-Rafael and Betker (2012a) .....	79
Figure 4. Emerging themes related to Critical Caring Theory (Falk-Rafael, 2005).....	182
Figure 5. Extended View of Falk-Rafael’s (2005) Critical Caring Theory .....	183

## List of Abbreviations

AHRQ	Agency for Healthcare Research and Quality
BC	British Columbia
BCCDC	British Columbia Centre for Disease Control
CCHN	Canadian Community Health Nurses
CHN	Community Health Nurse
CHNC	Community Health Nurses of Canada
iPHIS	integrated public health information system
LHA	Local Health Area
MCFD	Ministry for Child and Family Development
NFP	Nurse-Family Partnership
NOC	Nursing Outcomes Classification system
PHN	Public Health Nurse
PHSA	Provincial Health Services Authority
PRAMS	Pregnancy Risk Assessment Monitoring System
UK	United Kingdom

## Acknowledgements

The past seven years have been a memorable journey of expanded learning, unexpected opportunities, and gathering new friends, as I explored the world of public health nursing in more depth than I ever had time to do while working in public health. I would like to thank my academic supervisor, Dr. Marjorie MacDonald for her enthusiastic support, her vision, wisdom, and experience, and her ongoing encouragement to continue looking further. She has provided me with wonderful opportunities, including becoming a part of research teams, gaining teaching experience, assisting in writing a book chapter, and presenting at national and international conferences. I would also like to thank the members of my supervisory committee, Dr. Lenora Marcellus and Dr. Elizabeth Borycki, both of whom have provided much needed guidance, direction, and encouragement along the way, and who have pointed me in new directions to explore areas that I might have otherwise missed.

I would also like to thank the group of doctoral students and professors who have provided so much friendship, kindness, reassurance, and inspiration as we discussed and debated so many subjects over chocolate, coffee, lunches on the veranda, dinners, knitting, and quilting. Special thanks to my good friend Megan Kirk, whose enthusiasm and energy gives me great hope for the future of public health nursing.

This research was supported by many different funding sources including Doctoral Fellowships from the University of Victoria and through the Core Public Health Functions Research Initiative and Marjorie MacDonald's CIHR Applied Public Health Chair, the Dr. Ken Benson Memorial Bursary from the Health Officers' Council of BC, the Phyllis M. Baird Memorial Award through the Public Health Association of BC, Vancouver Island Health Authority Scholarships, and the RNFBC Vancouver General Hospital School of Nursing

Alumnae scholarship. These financial contributions have been greatly appreciated, and have made this educational journey so much easier.

A special thank you to all the public health nurses and administrative support staff who have championed my interest all these years to learn more about the valuable work they do to support individuals and communities. From counting breastfeeding indicator labels on HLTH 182's to pestering the iPHIS developers for reports on perinatal outcomes, this team has provided me with amazing support, grounding, and insight. And to the group of nursing leaders whose inspiration and passion maintained our focus on the questions: "why do we do what we do?" and "what difference does it make?", thank you for sticking together through all the organizational upheavals. I especially appreciated the candid and open discussions with the public health nurses who took the time to talk with me about their experiences working with priority perinatal women, and who have made such a huge contribution to this research project.

Finally, I want to thank my family for their ongoing caring and patience. My husband, Jan, and our daughters Genevieve and Alexandra, all of whom have provided unwavering support and encouragement, along with countless hours of consultation and debate, helping me to consider issues from a broader range of different perspectives. And special thanks to my mother and grandmother, both nurses themselves, whose stories captivated me from a very early age and set me on this journey in the first place.

Don't let it be forgot  
that once there was a spot  
for one brief shining moment that was known as Camelot.  
(Loewe & Lerner, 1962).

## **Chapter I - Introduction**

The purpose of this study was to investigate how routine, day-to-day public health nursing (PHN) practice affected health outcomes related to breastfeeding initiation and duration, infant immunizations, and household tobacco use within the population of perinatal women who were a high priority for additional and ongoing PHN services in one British Columbia (BC), Canada health authority. These three outcomes were selected because PHNs routinely enquired about them at each postnatal and child immunization encounter, before documenting that information electronically. Using administrative data from the integrated public health information system (iPHIS) for PHN client documentation, outcomes for the priority population were compared to those of the general population of new mothers receiving usual PHN services in the same communities. Additionally, this study explored how the context of the PHN work environment influenced their practice and ultimately the achievement of those outcomes. Through the use of mixed data collection and analysis methods in a case study design, I used administrative data to measure outcomes, along with interviews with PHNs, and provincial and health authority guiding documents to explore organizational factors that affected their work with priority perinatal women. Although PHNs operated within a multidisciplinary environment, working together with other professions and community partners, the focus of this research project was to examine the role of PHNs because they made up the majority of professionals who provided a broad range of services within the community context to perinatal families.

### **Researcher Standpoint**

I developed an interest in priority perinatal families after working in the field of public health nursing for many years, initially as a front line PHN visiting families, later as a clinical supervisor of PHNs, and finally as a manager of a variety of community health programs. In

2013, I left the employ of the health authority to pursue doctoral studies on a full-time basis. As a PhD student, I chose to explore the subject of PHN involvement with priority perinatal women. From the perspective of a manager, my intent in conducting this research was to gain insights that would help to improve maternal and child outcomes by examining the real-life practice of PHNs.

For this research project, I selected the health authority in which I had spent much of my career because of my familiarity with the system and the people. Aside from the convenience of access to participants, this health authority was typical of other provincial health authorities in the nature of PHN practice, and I felt that it would provide a representative picture of the kind of services PHNs provide to priority perinatal women. This health authority also had an established relationship with the University of Victoria in the form of a harmonized ethics board approval process.

During the period from 2009 to 2012, when the administrative data for this project was being accumulated, I had been the manager of two of the three local health areas involved. When I began this research project I no longer had any formal connections with the health authority, or with the PHNs I hoped to interview, however I did know many of the nurses on an individual basis.

As a researcher, I felt it was important to clearly position myself to lend credibility to my findings. My extensive background in the field of public health nursing gave me a certain amount of insight that contributed to the interpretation of findings in this research project. Such an insider position, in which researchers are a part of the group they study, is increasingly common, although there are both advantages and disadvantages to this role (Breen, 2007; Bonner & Tolhurst, 2002; Unluer, 2012; Yin 2009). Prior knowledge of the system helps in

understanding the culture of an organization, the establishment of trust, and provides familiarity with the members of the group through relationships already established (Bonner & Tolhurst, 2002; Breen, 2007; West, Stewart, Foster, & Usher, 2013). Yin (2009) suggests that being an insider provides an opportunity to see reality from a different perspective. However, there are disadvantages to this role including loss of perspective, the risk of making erroneous assumptions, and the challenge of maintaining an objective distance from a familiar subject (Breen, 2007; Bonner & Tolhurst, 2002; Gerrish, 1997).

An insider researcher has been defined as a researcher who studies a group to which they belong (Bonner & Tolhurst, 2002; Breen, 2007). This role has also been identified with the participant-observer role, involving a continuum of positions ranging from complete participant to complete observer (Creswell, 2013; Gold, 1958). Breen (2007) discussed the challenges of an either/or dichotomy when it came to being either an insider or an outsider, choosing instead to be identified as a researcher “in the middle” (p.165). In my case, I did not begin to formally study the group to which I belonged, until after leaving that organization. My data collection process did not include a formal participant observer role, although I did keep a record of thoughts and recollections of my own experiences of the organization throughout the course of data collection. This was done with the intention of supporting research rigor by providing additional background and interpretation of findings. For the purposes of this research project, I saw my role as participant-observer with the understanding that it reflected this past insider perspective sitting midway along the continuum of participant-observer roles, recognizing that organizational structures and local practices may have changed since the time I worked there. In this way, I have included my own experiences where appropriate to contribute an additional perspective, or

to support the observations of PHNs. As I proceed to describe the research project, this explanation of my standpoint as a participant observer should help to inform my perspective.

## **Background**

Since the early 1900s, PHN practice in British Columbia has involved the delivery of supportive services for mothers and infants (Green, 1984). Almost one hundred years later, PHNs continue to offer additional supports to women who experience complex social challenges in the perinatal period. Although PHNs offer services to all families, they work more closely with priority families towards mutual health goals by providing a range of education, anticipatory guidance, emotional support, practical assistance, and referrals to appropriate community agencies (Hill, 2010a, 2010 b). PHNs accomplish this by establishing and maintaining relationships with women and their families through ongoing home visits and frequent contact.

The health of mothers and infants, and the general population, has long been a focus of PHN services in British Columbia (Green, 1984). The Integrated Model of Population Health Promotion (Hamilton & Bhatti, 1996) identifies various health determinants, three of which are: personal health practices and coping skills; healthy child development; and health services such as well baby and immunization clinics, and education programs about healthy choices. These form part of the rationale upon which PHNs provide service in the areas of maternal and child health, and why PHN support of women in the perinatal period aims to improve tobacco reduction, breastfeeding rates, and infant immunization. The model of population health promotion explains how health promotion strategies can act on the range of health determinants through a population health approach. This incorporates the need for evidence-based decision-making utilizing research studies, experiential knowledge, and evaluation studies of programs

and policies (Hamilton & Bhatti, 1996).

As a publically funded service, it is important to know whether such nursing services make a difference to the health of the population. Although information is regularly collected in the iPHIS by PHNs, little has been done to use this information to assess the achievement of particular preventive health goals within specific client populations. The purpose of this research project was to investigate how routine, day-to-day PHN practice affected three outcomes of interest using information routinely collected by PHNs through client documentation in iPHIS. More specifically, this project examined the influence of PHN practice on health outcomes related to breastfeeding, household tobacco use, and infant immunizations for priority perinatal families compared to those of the general population of new mothers. In addition, this research examined the organizational influences that affected the ability of PHNs to provide service for these families. Although numerical outcome information is important, understanding the context of the PHN work environment provided an opportunity to consider the underlying influences or mechanisms within the health care organization that had a substantial effect on the outcomes achieved.

Public health nurses work with individuals, families, and communities to achieve health outcomes that ultimately affect the health of the population (Community Health Nurses of Canada, 2011). Some research has demonstrated PHN effectiveness under specific conditions with specific populations, however little research has been done to assess the day-to-day work of PHNs under changing organizational influences and in a variety of communities. Over the years some aspects of service, such as childhood immunizations, have been tracked and monitored in BC. Little is known however, about the effectiveness of other aspects of public health nursing services, such as the ongoing supports that PHNs offer to individual women negatively affected

by the social determinants of health, or the effects of broader health promotion activities aimed at issues such as breastfeeding or smoking. Such services are not routinely monitored, and thus their effectiveness is not well understood. This is an important consideration in the development of policies, allocation of funding, and educational supports provided for PHNs.

Currently PHN services in BC are funded by regional health authorities which, in turn, are funded by the Provincial Government's Ministry of Health. At present, there are five regional health authorities serving the province of BC, and providing a range of preventive and acute care services. In 2013, the BC Ministry of Health released its Guiding Framework for Public Health that highlighted the importance of support for vulnerable families in the pre- and postnatal periods (BC Ministry of Health, 2013). During the time of this study, as well as providing services for all perinatal women, PHNs also offered additional and ongoing support to perinatal women at increased social and economic risk who came to their attention, and who voluntarily accepted PHN services.

### **The priority perinatal population.**

As both a PHN and a manager of PHN services in BC, I have been particularly interested in the health outcomes achieved by families who receive additional and ongoing support from PHNs throughout the perinatal period and into the first two years of a child's life. While most new mothers may have received one or two postnatal visits from a PHN, some women are offered more visits on an ongoing basis. Such ongoing contacts are intended to provide support, encouragement, and information as needed for each individual. The population that is often prioritized to receive additional and ongoing PHN involvement is that of pregnant and postpartum women who may be negatively affected by the social determinants of health, and who may have a number of social risk factors. The social determinants of health are those social

and economic conditions such as housing, employment, income, and food security, which influence the health of individuals and communities (Raphael, 2004). Social risk factors, as outlined by the Canadian Institute of Child Health (1993), include such things as low socioeconomic status, maternal age of less than 19 years, low education status, unstable housing, social situation with lack of available supports, marital distress, lack of prenatal care before six months, intimate partner violence or substance use. Vulnerable populations have been described as social groups with an increased susceptibility to poor health outcomes because of these factors (Flaskerud & Winslow, 1998). Such groups often include those who are disenfranchised, or poor, and typically include women and children as well as immigrants, ethnic people of colour, the homeless, and others (Flaskerud & Winslow, 1998). Briscoe, Lavender, and McGowan (2016) describe women as being vulnerable when “they experience ‘threat’ from a physical, psychological or social perspective, where ‘barriers’ and ‘reparative’ conditions influence level of vulnerability” (p.9). They suggest that better outcomes for women are produced with the involvement of warm professional relationships (Briscoe, Lavender, & McGowan, 2016).

To describe this subset of the population, language is needed that is both specific and respectful. The terms sometimes used to describe this population, such as *at risk*, *low-income* or *vulnerable*, tend to be used inconsistently, are often inadequately defined, and are sometimes considered disrespectful. For the purposes of this study I use the phrase *priority perinatal women* to describe that portion of the pre- and postnatal population with social risk factors, identified by PHNs to receive additional and ongoing support.

This subset of the perinatal population is of particular interest because these women are more likely than women without such risk factors to experience poor health outcomes in the areas of infant immunizations, breastfeeding, and maternal tobacco use (Adams et al., 2008;

Ahluwalia, Morrow, & Hsia, 2005; Erickson & Arbour, 2012; Falagas & Zarkadoulia, 2008; Kim, Frimpong, Rivers, & Kronenfeld, 2007; Renfrew et al., 2012; Strathearn, Mamun, Najman, & O'Callaghan, 2009; U.S. Department of Health and Human Services, 2014). The Public Health Agency of Canada, in its National Immunization Strategy (2003), has identified immunization as an important strategy to reduce the spread of vaccine preventable diseases, and they have also recognized that populations with low socioeconomic status are at greater risk of not completing the basic childhood immunization series (Public Health Agency of Canada, 2003).

Similarly, in relation to breastfeeding, while the Innocenti Declaration of the World Health Organization and UNICEF (1990) has identified breastfeeding as the ideal nutrition for healthy infant development, the American Academy of Pediatrics notes clinically significant sociodemographic and cultural differences in initiation rates of breastfeeding, with lower rates particularly among low-income women under the age of 20 years (Eidelman & Schanler, 2012). The Canadian Pediatric Society notes that pregnant adolescents have lower levels of breastfeeding as well as higher rates of smoking (Flemming et al., 2013; Thompson, 2016). Tobacco use is also a concern, with numerous prenatal and postnatal pathophysiological effects including sudden infant death syndrome and low birth weight (Rosenthal & Weitzman, 2011). Erickson and Arbour (2012) examined data from the BC Perinatal Database Registry over the years 2001-2006, and found that heavy smokers were more likely to be single parents, use drugs or alcohol, have dropped out of school, and to be multiparous.

It is difficult to estimate the numbers of women who may be considered a priority for PHN service. Some approximations can be found through Perinatal Services BC where surveillance of certain indicators is tracked. One of these indicators is the rate of smoking during pregnancy.

During the timeframe of this study, for the health authority involved, the rates of smoking ranged between 12 and 14 per 100 deliveries (Perinatal Services BC, 2015a). Other indicators, such as those for breastfeeding initiation, reflect the larger population of all women, and do not identify the smaller population of priority women.

### **PHN involvement with priority perinatal women.**

Evidence has shown that PHNs working closely with such families can make a positive difference in each of these important health areas (Fetrick, Christensen, & Mitchell, 2003; Kim et al., 2007; Koniak-Griffin, Anderson, Brecht, Verzemnieks, Lesser, & Kim, 2002; Olds, 2006). The goal of PHNs working with these families is to improve a variety of health outcomes including those related to breastfeeding initiation and duration, infant immunizations, and maternal tobacco reduction (BC Ministry of Health, 2005). Unfortunately, reports about the outcomes achieved by this particular group of women have not been routinely extracted from iPHIS, where PHNs routinely document client service.

In BC, one way of identifying this population has been by using the Nursing Priority Screening Tool (Parkyn, 1985; Perinatal Services BC, 2011). This tool lists a number of social risk factors similar to those outlined by the Canadian Institute of Child Health (1993) including such things as low education or socioeconomic status, young maternal age, and lack of available social supports. Based on cumulative risk, this tool provides PHNs with a way of determining which families should be offered additional contacts and supports. The resulting score of this assessment is captured on the electronic client health record. The tool is currently included by Perinatal Services BC in their suite of provincial perinatal documentation forms (Perinatal Services BC, 2011), and is familiar to the many PHNs who have used it since its introduction in 1985 (Parkyn, 1985). Over the years, it has been taken up by other jurisdictions including

Alberta, Saskatchewan, Manitoba, Ontario, New Brunswick, Nova Scotia, and Newfoundland (National Collaborating Centre for Determinants of Health, 2009).

Although the Nursing Priority Screening Tool has not been used consistently by all PHNs, familiarity with the kinds of risk factors it covers has enabled PHNs to identify and offer increased and ongoing contact and support for those who may need it. These extra visits provide an opportunity for PHNs to develop a trusting relationship with women who often have few supports of their own. In this way practical supports, such as breastfeeding skill and knowledge, immunization information, and a wide range of information and reassurance about becoming a new parent are offered. Through routine documentation, PHNs record the number, nature, and purpose of client contacts in iPHIS. Women whose records show that they received five or more postnatal contacts are those whom PHNs have identified as being in need of ongoing support, and who have also accepted the services of PHNs. Without a specific risk indicator in iPHIS to identify women who need extra support, it is this higher number of postnatal contacts with perinatal women that serves to distinguish those considered to be a priority for PHN service, and for whom key health outcomes were examined.

Intensive home visitation by PHNs has been shown to improve outcomes, such as breastfeeding, and improve resource use among vulnerable families (Fetrick et al., 2003; Flynn, Budd, & Modelski, 2008; Koniak-Griffin et al., 2002; Olds, 2006; Raisler, 2000; Tough et al., 2006). Both Olds et al. (1986) and Raisler (2000) recognize the establishment of a supportive relationship between the PHN and the mother as being an important aspect in improving health outcomes. However, many of these studies involve specialized programming and PHN training, a narrow population focus such as teens or first time mothers, reduced and focused PHN workloads, or a higher ratio of supervisors to PHNs. This differs from most PHN services in BC

where individual PHN workloads may involve a range of services including communicable disease follow-up, immunizations, school health, as well as perinatal services for the whole community (Dubas, 2012), leaving less time to focus on priority families. Having worked in this health authority, it has been my experience that workloads, ongoing training, and levels of supervisory supports are established independently by health authorities, based on Ministry of Health funding, and may differ from community to community. This means that in day-to-day practice, not all PHNs have the same degree of organizational support for working with priority perinatal women.

### **Priority perinatal women as a focus in BC.**

Several years ago, the BC Ministry of Healthy Living and Sport outlined the core services expected for public health in the province. The Model Core Program Paper for Reproductive Health and Prevention of Disabilities (British Columbia, 2005) was based on a review of the evidence about effective perinatal services and supports for “vulnerable and low income women” (p. iv) and outlines appropriate approaches for providing these services. Later the BC Ministry of Health released its guiding framework for public health (BC Ministry of Health, 2013), which outlines the updated expectations for the public health system, recognizing that some women experience conditions that put their health at risk, and highlighting the importance of prenatal and postnatal support for these vulnerable families. Acknowledging the importance of support for this segment of the population, the Ministry outlined key performance measures expected from provincial Health Authorities, which provide public health nursing services. These maternal, child, and family health indicators for BC include reduction of low birth weight, maternal smoking and alcohol consumption, and reduction of the percentage of children identified as vulnerable on early development indicators (BC Ministry of Health, 2013).

### **The nature of PHN practice.**

PHNs are educated with a baccalaureate degree in nursing, and work out of health unit offices located in twenty communities across this health authority, offering a range of health promotion, disease prevention, and support services for women, children and families (Island Health, 2013). PHN services are provided in homes, schools, community settings, and health unit offices, focusing on individual as well as community levels of health. This includes such activities as prenatal classes, newborn home visits, breastfeeding clinics, breastfeeding promotional events, parent support groups, immunization clinics, school health education, assessment, consultation and referral services, youth birth control clinics, communicable disease follow-up, and adult immunization clinics (Dubas, 2012). In this health authority PHN practice is built on two key Canadian documents, but is influenced by the local and provincial context. PHN practice in Canada is described by the Canadian Community Health Nursing professional practice model and standards of practice (Community Health Nurses of Canada, 2011), and by the Canadian Public Health Association (2010) in their document “Public Health ~ Community Health Nursing Practice in Canada: Roles and Activities”.

The Canadian Public Health Association (CPHA) makes it very clear that PHNs have a role in linking the health of individuals, families, and communities to population health promotion practices (Canadian Public Health Association, 2010). The CPHA recognizes that among other activities, PHNs play a significant role in skill building, advocacy, capacity building, care and counseling, case management, health education, and outreach, all of which involve individuals, families, as well as communities. Engaging with clients, building trusting relationships, and providing services in areas where risk is higher are key components of the work that PHNs are expected to do. In addition, they are expected to use evidence-informed and best practices in

planning their services in order to be accountable and responsible for the management of resources (Canadian Public Health Association, 2010).

The Canadian Community Health Nursing Professional Practice Model and Standards of Practice (Community Health Nurses of Canada, 2011) also provide guidance about the roles and activities of PHNs. One of the primary roles of PHNs is to focus on “promoting, protecting, and preserving the health of populations” (Community Health Nurses of Canada, 2011, p. 30).

*Population health* is a term used to describe a focus on the health of entire populations (Smith, Van Herk, & Rahaman, 2012). In addition, the Community Health Nurses of Canada standards highlight the importance of responsibility and accountability in making decisions about service delivery, taking into account the need to support health equity and social justice, the allocation of scarce resources, and the use of current evidence and informatics to generate and manage pertinent data to support nursing practice. This includes the identification of desired outcomes and indicators, and the evaluation of those outcomes for quality improvement. These standards also stress the importance of PHNs facilitating access and equity by ensuring that resources and services are made available to those who need them the most. This involves such strategies as home visits and outreach for potentially vulnerable populations.

Throughout the standards, reference is made to the work that PHNs do in collaboration with individuals, families, and communities (CHNC, 2011). At the same time that population health and health promotion are essential components of practice for Canadian Community Health Nurses, the importance of PHNs working with individuals and families is linked through a client-centered approach, supporting informed decision making, and respecting the specific circumstances and requests of individuals and families (CHNC, 2011). This ties the broader goals of health promotion and population health, such as higher rates of breastfeeding and

immunization, and lower rates of tobacco use, to the needs and issues of individuals and their families.

### **Health promotion and population health.**

The work of PHNs in health promotion has a strong rationale, grounded in several key international documents. The Ottawa Charter for Health Promotion (World Health Organization, 1986) defines health promotion as “the process of enabling people to increase control over, and to improve, their health” (p. 1). Health promotion aims to achieve equity in health, which involves reducing the burden of ill health among the economically and socially disadvantaged (Whitehead & Dahlgren, 2006). One of the key strategies for health promotion action is the support of personal and social development through the provision of education and information regarding health and life skills for individuals and communities in a variety of settings, including the home (World Health Organization, 1986).

Building on the Ottawa Charter, the Jakarta Declaration on Health Promotion (World Health Organization, 1997) recognized that investments in health should reflect the needs of particular populations including women, children, the poor, and the marginalized. The subsequent 2005 Bangkok Charter for Health Promotion (World Health Organization, 2005) reiterated that health promotion is a core function of public health. Additionally, the Nairobi Call to Action for Closing the Implementation Gap in Health Promotion (World Health Organization, 2009) identified the need to improve performance management by strengthening information systems to assist in the monitoring of health promotion implementation including outcomes, and to build the capacity of health professions to maximize their use of information and communication technologies. At an international level, the foundations of health promotion have been clearly outlined. At a national level, the work of PHNs in Canada has also been shown to have a

foundation in health promotion.

Public health nurses strive to “promote, protect and preserve the health of individuals, families, groups, communities and populations” (Community Health Nurses of Canada, 2011, p. 4). PHNs have the theoretical and practical foundations to improve the health of populations through interventions based in social justice (Schim, Benkert, Bell, Walker, & Danford, 2006). PHNs work with populations and sub-populations, such as mothers and children who may be at risk for poor health. The metaparadigm of community health nursing incorporates aspects of knowledge and beliefs inherent in the profession, and includes social justice as a key element (Schim et al., 2006). Social justice relates to the fair distribution of resources, and is based on the concepts of equity and human rights (Canadian Public Health Association, 2010).

Population-based practice focuses on populations, utilizes community assessment, considers determinants of health, emphasizes prevention, and intervenes at many levels from the community to the individual (Olson-Keller, Strohschein, Lia-Hoagberg, & Schaffer, 2004). Using population health promotion practices, PHNs work to improve the health of individuals, families, and communities in an effort to diminish inequities (Canadian Public Health Association, 2010). Inequities are apparent in such groups who may already be socially disadvantaged by virtue of such things as being part of a racial or ethnic minority, living in poverty, or being female (Braveman & Gruskin, 2003). The term *health inequity* has been defined as differences in health that are unfair, unjust, unnecessary, and avoidable (Whitehead, 1992).

### **The Purpose of This Study**

The purpose of this case study in one BC health authority was to investigate how routine, day-to-day PHN practice affected three key health outcomes for the priority perinatal population

in relation to those of the general population of new mothers, and to consider the effect of organizational factors on the ability of PHNs in routine, day-to-day practice to support priority perinatal women in achieving those outcomes. This population of women included all those who may be negatively affected by the social determinants of health.

Unlike some research studies in which nurses worked only with teen mothers, or had small and time limited caseloads, this study examined outcomes based on routine, day-to-day PHN practice. Everyday practice for PHNs included a wide range of work done as a regular part of their employment with the health authority. Depending on their work assignments, PHNs in different areas may have offered all of these activities for a geographic district, while others may have focused only on specialty areas such as prenatal and postnatal care. Nurses in day-to-day practice constantly juggle priorities, as new and unexpected demands on their time arise. It is important to recognize the effect of this routine PHN practice because this is the reality in which services are delivered and program plans are developed, and we know very little about the effects of routine PHN practice.

This case study involved the examination of anonymized administrative data based on daily PHN documentation of client services in iPHIS for three local health areas within one BC Health Authority. This data involved all births over a specified two-year period, as well as relevant data for two years beyond birth. Information on breastfeeding initiation and duration, household tobacco use, and infant immunizations was compiled for the whole population of new mothers and their infants, and comparisons were made with that of the priority population of mothers and infants.

Numbers alone, however, cannot account for the context that affects the many other factors involved in the achievement of desired health outcomes. It is important to understand the

broader picture surrounding the data that may have a significant bearing on the outcomes achieved. Other demands on PHN time, such as the H1N1 flu epidemic, means that over some time periods PHNs had less time to work with priority families. Even factors like staffing levels within the organization, combined with population growth may have altered the ability of PHNs to connect with priority families as frequently as intended.

For this reason, a second aspect of this study was to consider the organizational contexts that influenced the ability of PHNs to provide supports to the priority perinatal population during that same period of time. This was accomplished by using semi-structured qualitative interviews with a voluntary sample of PHNs and PHN leaders who worked in this organization supporting or providing services to the perinatal priority population. The views of PHNs and PHN leaders regarding the organizational factors that may have influenced the achievement of client outcomes help to provide context and a better understanding for PHN leaders as they consider the impact of PHN service delivery. As well, key guiding documents, such as practice guidelines, were analyzed to provide further understanding of the organizational directions at the time. The analysis of these data should help to highlight the complex nature of service delivery, and provide a better understanding of the factors that influence the effectiveness of PHN service delivery at the individual, community, and systems levels of practice.

#### **Using data to assess outcomes.**

The idea of using data as a way to analyze social conditions and the effectiveness of public policy in health care goes back to Florence Nightingale (Keith, 1988). She insisted that the key to building health was by starting with infants and children, and being aware of the role of influences such as the age of the mother, number of pregnancies, and social conditions (McDonald, 2010). Florence Nightingale was also concerned about spending the taxpayer's

money carefully, and recommended that uniform reporting procedures would enable comparisons regionally and nationally, providing benchmarks in data collection (McDonald, 2010).

Information from health record databases is a way for nurses to identify practice patterns and to compare them against local benchmarks or national standards (Cheung, Moody, & Cockram, 2002; Rumay Alexander, 2007). Quality of care and patient safety can be improved by using information about nursing interventions and client outcomes (Goodwin, VanDyne, Lin, & Talbert, 2003). An American inquiry conducted to explore PHN interventions with perinatal families at risk, involved structured clinical data from PHN client documentation (Monsen, Radosevich, Kerr, & Fulkerson, 2011). Using routine PHN home visiting practice, and a sample of computerized records collected over a six-year period in a Midwest US public health agency, a retrospective cohort was created involving pregnant adolescents and adults who had received at least three PHN visits (Monsen et al., 2011). The electronic documentation system used in this project involved the Omaha System, which is a taxonomic structure that organized health data into 42 defined problems (Monsen, et al., 2011). The findings of this inquiry identified the importance of standardized terminologies in describing the interventions used by PHNs, and demonstrated the potential to use this clinical data to examine the relationship between PHN interventions and client outcomes. This study has several similarities to my case study, particularly in the range of clients served, and the fact that it looked at routine PHN services. This contrasts with research projects, such as the Nurse-Family Partnership program (Olds, 2006), that limited participants to a narrow range of vulnerable perinatal women, and utilized specially trained PHNs.

One issue that Monsen et al. (2011) highlighted is the need for rigorous fidelity to

documentation standards. Monsen and Kerr (2004) stress that it is up to the individual nurse to maintain the standard of data. This involves proper orientation, training, and organizational policies as well as committed leadership. This is reinforced by findings from Cross and MacDonald (2013) in their grounded theory approach examining how nurses incorporated computers into clinical practice. They noted the importance of education and training, organizational policies and procedures, as well as organizational structures and processes.

Although standardized languages may be established in some health care organizations, it is still up to the individual nurse documenting client care to maintain that standard. Documentation which becomes data must be accurately and uniformly entered into the system (Monsen & Kerr, 2004). Not only does this process take orientation and training, but it also necessitates organizational policies to support it (Monsen & Kerr, 2004). Routine record audits help to ensure that nurses learn the correct system and are able to maintain consistency despite their clinical skill and experience (Monsen & Kerr, 2004). In order to maintain and improve data quality, Monsen and Kerr (2004) highlighted the need for a dynamic process involving data analysts, managers and front line nursing staff, with frequent feedback about service and client outcomes compiled from nursing documentation. Administrators need to recognize the importance of providing their staff with adequate technical, clinical and psychological supports in order to motivate staff to maintain quality data entry (Goodwin et al., 2003).

Once the data has been mined, cleaned, and prepared for analysis, there are various statistical approaches that can be used including exploratory, descriptive and predictive methods each with their own techniques (Cheung et al., 2002). Often the software used to collect data has the capacity to produce reports (Monsen & Kerr, 2004). When reports are not automatically generated, or when information is sought that is not captured by a standard report, data analysts

can provide further information through the use of statistical analysis software. This however, still requires the insight of practitioners to ensure that the data is correctly interpreted (Monsen & Kerr, 2004). For example, Cheung et al. (2002) note that in comparing data accumulated over a period of time, historical changes in practice may affect the validity of comparison data.

Based on my experience working in this health authority, I found that routine auditing to assess fidelity to documentation standards was not an established practice. Although some regular reports were available from iPHIS, none examined subsets of the population, such as priority perinatal women. Formal program evaluations regarding outcomes of services, other than for immunizations, were not conducted. It appeared to me that changes to program delivery were sometimes based on personal experiences, limited evidence, or on financial or political directives from leaders at higher levels within the healthcare or political system. With the advent of iPHIS came the realization that routine PHN documentation on client records formed a database with vast amounts of information regarding client outcomes related to their services. Such a large source of data could provide managers with information about the effectiveness of services directed towards various subsets of the population. Even though PHNs have been involved in providing services to perinatal families in need of additional supports for many years, little was known about the current level of effectiveness of these supports in achieving key health goals for this particular segment of the population. iPHIS was one source of information that could improve that understanding.

PHN practice with individuals and families was regularly documented in iPHIS, and included a variety of specific details relating to the health or circumstances of each person. As a public health information system, this electronic database has been used to monitor the immunization rates of children across BC and within health authorities. Despite the vast range of

data collected through routine documentation, little use has been made of that data to provide information regarding a variety of health outcomes for the smaller portion of the population who received additional and ongoing PHN support. Some might suggest that the existence of such data creates an ethical imperative to use it in support of care for both priority perinatal women, and for the larger population of new mothers. This kind of data could be used to measure the impact of PHN effectiveness through the identification and monitoring of nursing sensitive indicators, and ultimately to help improve care for these women and the population as a whole.

### **Nursing sensitive indicators.**

An indicator is an approximate, reasonable, meaningful, and useful measure of an intended outcome, and one that it is clear, specific, and measurable (Patton, 2008). A key principle is that it is essential to identify outcomes that matter to those involved, that is outcomes that are based on the goals an organization hopes to achieve (Patton, 2008). One way to measure the impact of PHN effectiveness is through the identification of nursing-sensitive outcome indicators.

A nursing-sensitive indicator is distinct and specific to nursing, and identifies care processes that influence care outcomes (Montalvo, 2007). They are based on nurses' scope of practice, with empirical evidence linking nursing interventions to outcomes (Doran, 2004). The Nursing Outcomes Classification (NOC) system, developed at the University of Iowa College of Nursing, provides standard measures for client outcomes that are influenced by nursing interventions, and among others, includes nursing outcomes related to breastfeeding, tobacco use, and immunizations (Johnson & Maas, 1998).

PHN-sensitive outcome indicators were not identified as an established part of the present iPHIS system in BC. As a result, standardized, consistent, and accessible nursing-sensitive

indicators were not available to managers or others to assess the effectiveness of PHN programs and services. However, when direct measures of nursing outcomes are not accessible, proxy measures may be used (Johnson & Maas, 1998). Such proxy measures may be found within the iPHIS. iPHIS is a web-based, integrated client-centred case management information system that was routinely used by PHNs in BC to document information about individual clients (Commissioner of Health Services, 2003). Although it has since been replaced by Panorama, a newer public health information system, all iPHIS data has been transferred over to Panorama. Details about infant feeding, tobacco use, and immunizations were noted by PHNs at each immunization clinic visit, as well as at other PHN encounters with clients. For the purposes of this study, infant immunizations, breastfeeding, and household tobacco use are used as proxy measures for outcome indicators based on the goals of PHN work.

iPHIS provides a body of data that yields useful information about these outcomes for the health authority. Although these data may describe different levels of maternal and infant outcomes in different communities, they do not reflect the context that determines the many other factors involved in the achievement of desired health outcomes, nor does it provide any explanation about why rates may differ from one community to another across the organization. The use of a case study design incorporating mixed method data collection and analysis is one research approach that will identify outcome trends, as well as illuminate a range of factors that influence PHN practice, and link these to outcomes.

### **Dissertation Outline**

The objective of this research project is to explore health outcomes for priority perinatal women who received additional and ongoing services from PHNs, delivered in the course of day-to-day practice. The project also considers the views of PHNs regarding the organizational

factors that influenced the provision of those services. This inquiry is based on the framework of critical caring theory, developed by Canadian Adeline Falk-Rafael (2005), who proposed seven carative health-promoting processes to guide the practice of public health nursing. It is these processes that help to explain the nature of the work PHNs did to achieve successful client outcomes. To that end, the specific research questions for this study are:

- How does additional and ongoing PHN contact with priority perinatal women relate to breastfeeding, infant immunizations, and household tobacco use compared to the general population of new mothers receiving usual services?
- How do organizational factors affect the work PHNs do to support priority perinatal women in achieving these outcomes?

The first step in examining these issues is to review the literature related to public health nursing and the three outcomes of interest. In chapter two I begin by explaining the use of an integrative approach to exploring the literature. Then, for each outcome of interest, I discuss why it is an important health concern, the populations least likely to have good rates, and provide a critical review of evidence that shows how, in some specific and limited circumstances, PHNs have made a positive difference with these groups. This sets the stage for my exploration of the impact of PHN practice in day-to-day practice.

Chapter three outlines the theoretical foundation that supports this inquiry. The aim of this chapter is to briefly discuss the various theoretical foundations that inform PHN practice as it relates to the nature of their work with the priority perinatal population. This includes the public health nursing intervention wheel (Olson-Keller et al., 2004) as an important foundation to PHN practice. However, the major focus of this section is on the theory of critical caring (Falk-Rafael, 2005; Falk-Rafael & Betker, 2012a), which provides a framework to guide public health

nursing practice.

In preparation for a discussion about the methodological approach to this inquiry, in chapter four I examine the philosophical foundations that support my research design. I examine Bhaskar's (1978) critical realism in some depth, and discuss how it fits with a mixed methods case study design. With its stratified ontology, critical realism seeks deeper levels of understanding and explanation about what we observe and experience (Appleton & King, 2002; McEvoy & Richards, 2006; Wainwright, 1997). Critical realism is a view that acknowledges not only the reality of science, but also the social aspects of humans, highlighting the influence and importance of human perspectives (Clark, Lissel, & Davis, 2008). This view supports an exploration of the measured outcomes relating to breastfeeding, immunizations, and tobacco, in conjunction with the perceptions of PHNs about the organizational factors that shape their work with priority perinatal women. It provides a way of reflecting on those organizational factors to identify underlying mechanisms that may influence PHN service, and as a result the achievement of the key outcomes. For these reasons, critical realism was chosen as a foundation for this mixed methods case study examining both quantitative administrative data regarding outcomes, as well as qualitative data from guiding documents and PHN perspectives.

Chapter five deals with the methodological details of this mixed methods case study inquiry. The chapter begins with a discussion about the background and philosophical roots of case study as a research design. It is followed by an examination of mixed data collection and analysis techniques, and the controversies surrounding this approach. Subsequently, the study protocol details are laid out showing how both quantitative and qualitative data were collected and analyzed. This is followed by an outline of the ethics approval process involving both the university and the health authority.

In chapter six, findings from the statistical analysis of the three outcomes of interest are discussed, and placed together with the findings of the thematic analysis of PHN interviews and guiding documents. This approach is based on Sandelowski's (2014) method of positioning qualitative and quantitative findings in juxtaposition to one another to help explain the results. The quantitative findings relate directly to the initial research question regarding the three outcomes of interest, and the qualitative findings provide background and context to those outcomes by exploring the organizational factors that affect the work that PHNs do with priority perinatal women. Chapter six continues with a discussion of the statistical analysis of breastfeeding initiation and duration rates for the group of priority perinatal women compared to the non-priority group. Similarly, the statistical results comparing infant immunizations and household tobacco use between priority and non-priority groups are examined. The themes that surfaced from PHN interviews and guiding documents are further considered in relation to the carative health-promoting processes of the critical caring theory (Falk-Rafael, 2005), showing the complex interrelationship among all of them.

Chapter seven focuses on the discussion and conclusions of study findings. It begins with a brief review of the philosophical, methodological, and theoretical foundations of this study, before presenting an interpretation of the findings. This is followed by an exploration of the underlying mechanisms that seem to be at play in the organization, and how they may influence the ability of PHNs to support priority perinatal women in achieving the outcomes of interest. Contributions to nursing knowledge are discussed showing how the critical caring theory is verified and extended by the findings of this study, and how PHNs make a difference with priority perinatal women. Limitations of the study are identified, and implications for practice, policy and research are presented. Concluding remarks about the research experience completes

the dissertation.

## **Summary**

The British Columbia Ministry of Health has identified the importance of PHN support for the population of perinatal women who experience conditions that put their health and the health of their children at risk (BC Ministry of Health, 2013). Public health nursing in BC is a government-funded service, and thus it is imperative that health organizations providing PHN services are accountable for the use of these limited resources. As well, there is an ethical imperative to do this work in the interests of improving health and promoting health equity, within a social justice perspective. iPHIS is one of the main sources of information about PHN service delivery that managers can use to assess the achievement of health outcomes, and to use in program planning. A review of client records can provide information about the nature of PHN services provided, and about the achievement of specific health outcomes, including breastfeeding rates, infant immunizations, and household tobacco use. Even though PHNs provide services to this population, there are numerous organizational factors that affect both the nature of this service and how it is documented in the electronic client health record. By examining multiple sources of data from different settings within a single organization, I believe the use of a case study design provides additional insight into the effectiveness of PHNs with priority perinatal women, and can provide an important contribution to nursing knowledge.

## Chapter 2 - Literature Review

The focus of this integrative literature review is on research involving public health nurses providing care to the priority perinatal population, and explores outcomes of care related to breastfeeding initiation and duration, infant immunizations, and household tobacco use. For the purposes of this research project, I defined the priority perinatal population as women in the perinatal period and up to two years postpartum whose health, and that of their infants, may be negatively affected by biological and social determinants of health, such as age, socio-economic status, and education levels, and for whom public health nursing services are prioritized. Within the literature this population is sometimes described by such terms as vulnerable, at risk, low income, disadvantaged, marginalized, or overburdened, however these terms are not consistently defined. Consequently, all of these terms were used in a comprehensive search of the literature in order to examine as wide a range of studies as possible.

In this review, I briefly summarize literature related to the issues of breastfeeding, infant immunizations, and maternal tobacco use in the perinatal period and up to two years postpartum. I then critique and synthesize literature associated with each of these three health issues particularly related to the priority perinatal population, and the role that PHNs play in achieving positive outcomes in these three areas with this population. Finally, I summarize my observations about the overall findings from these studies in relation to the nature of routine PHN practice. An integrative literature review approach was used for this analysis because it allows for the review, critique, and synthesis of literature in an integrated fashion (Torraco, 2005), and accepts the inclusion of diverse research methodologies in order to offer a more comprehensive perspective (Whittemore & Knaf, 2005).

This integrative review began with a comprehensive and systematic search of the literature using CINAHL, Medline, Web of Science, Pub Med, Google Scholar, Cochrane Database of Systematic Reviews, Joanna Briggs Institute EBP Database, Dissertations and Theses (ProQuest), and Open Grey. Further articles from forward citation or ancestry searching, and hand searching of high impact nursing and public health nursing journals were also located.

The search terms included: public or community health nurse; and social determinants of health, or vulnerable, or risk, or low income, or disadvantaged, or overburdened, or marginalized, or disenfranchised, or teen, or adolescent, or youth, or young adult; and prenatal, or antenatal, or postnatal, or perinatal, or pregnancy, or “mother infant”; and breastfeeding; or tobacco, or smoking, or cigarettes; or immunizations, or vaccinations. The search included quantitative, qualitative, and mixed methods research articles published in English since the year 1986. This time frame was chosen to include research that was more reflective of PHN practice involving population health and health promotion as described by the Ottawa Charter for Health Promotion (1986). This timeframe also includes the seminal work of Dr. David Olds who focused his research specifically on PHN involvement with young, single, and poor women in the pre- and postnatal periods. The geographic areas included in this review were the more developed democratic first world countries, where PHN interventions may be different from those in communist or underdeveloped, poorer countries.

Using the identified search terms, an initial search of the electronic databases resulted in over 3700 potential titles. Further refinement of the search strategies by including only scholarly or peer reviewed journals, application of inclusion and exclusion criteria, and hand searching of high impact journals produced 548 abstracts for further consideration. Table 1 below provides a list of the inclusion and exclusion criteria used to select studies for this review. The next stage

produced 179 studies for further consideration. The full text of each of these articles was reviewed to determine whether the research focus was on public health nursing rather than the broader health care team, whether the priority perinatal population was the main focus, and whether outcomes relating to breastfeeding, maternal tobacco use, and infant immunizations were included in the research findings. From the full text review, a total of 36 primary studies were critically appraised for quality and selected for inclusion in this analysis. Figure 1 below summarizes the steps involved in the review process. A summary of each of the key research articles is included in Appendix A.

**Table 1**  
***Inclusion and Exclusion Criteria for Literature Review Studies***

Parameters	Inclusion criteria	Exclusion criteria
<b>Time frame</b>	1986 to 2014	Studies before 1986
<b>Language</b>	English	Not available in English
<b>Geography</b>	North America, Europe, Australia and New Zealand	Africa, Asia
<b>Population</b>	Perinatal Women: Low-income, adolescent, vulnerable, at risk, disadvantaged Public health nursing, or similar nursing roles	Studies related to a broader health care team, or studies related to the general population of women in the perinatal period.
<b>Study type</b>	Primary research using quantitative, qualitative, or mixed methods of data collection and analysis, systematic literature reviews, and grey literature.	Editorials, opinion pieces, book reviews, policy documents
<b>Outcome</b>	Studies related to public health nursing and effects on breastfeeding, infant immunizations, or maternal tobacco use in the priority perinatal population.	

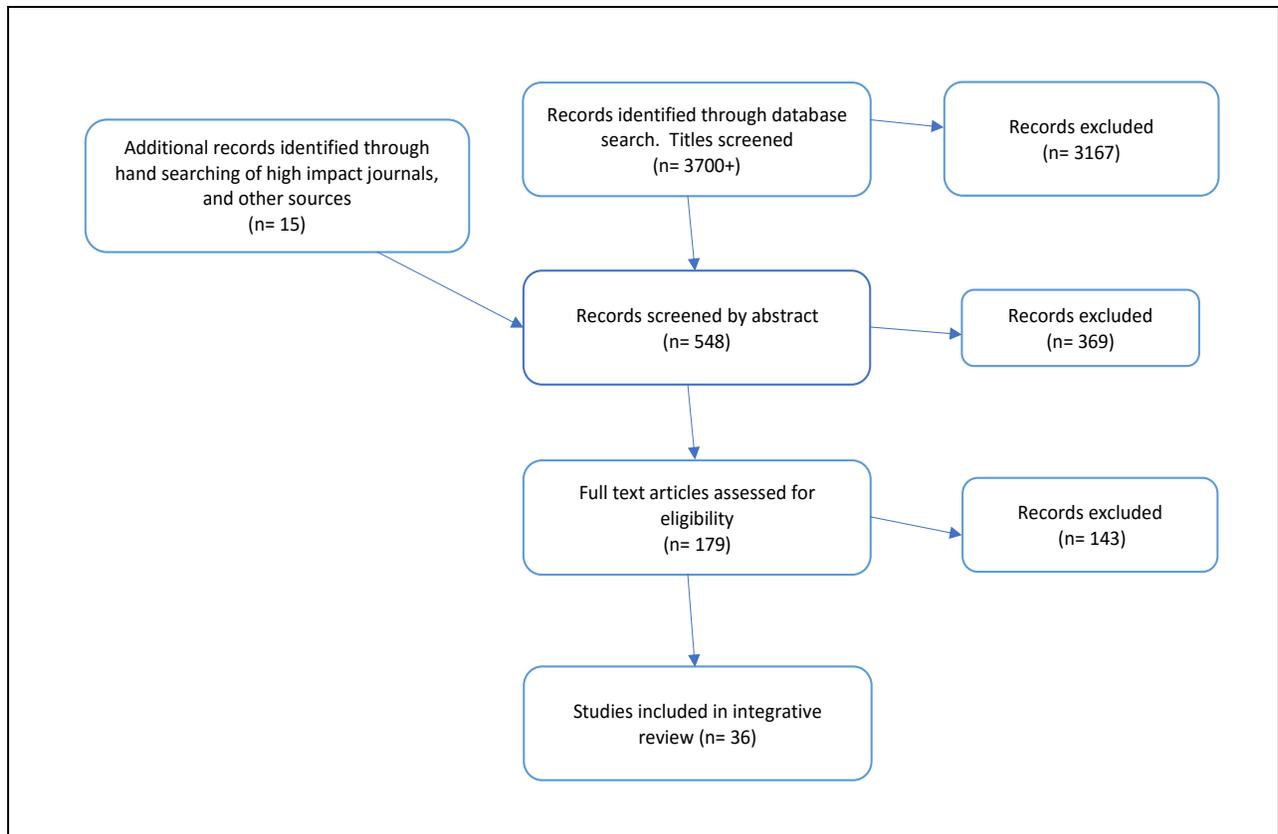


Figure 1. Flow chart of papers selected for literature review.

## Breastfeeding

Breastfeeding is the optimal method of infant feeding with significant benefits to both baby and mother. The Innocenti Declaration of the World Health Organization and UNICEF (World Health Organization, 1990) has identified breastfeeding as the ideal nutrition for healthy infant development up to two years of age and beyond. Health Canada recommends that exclusive breastfeeding for the first six months of life is the nutrition standard, and that breastfeeding should be supported for up to two years or beyond (Health Canada, n.d. a; Health Canada, n.d. b).

A meta-analysis done for the U.S. Agency for Healthcare Research and Quality examined the effects of breast milk feeding through a review of 43 primary observational studies on infant health, and 43 similar studies on maternal health, along with 29 systematic reviews or meta-

analyses (Ip et al. 2007). Findings included a number of significant associations with certain health outcomes (Ip et al., 2007). Although the duration of breastfeeding varied between these studies, it was found that among breastfed infants there was a reduced risk of “acute otitis media, non-specific gastroenteritis, severe lower respiratory tract infections, atopic dermatitis, asthma, obesity, type 1 and 2 diabetes, childhood leukemia, sudden infant death syndrome, and necrotizing enterocolitis” (Ip, et al., 2007, p. v). The World Health Organization and UNICEF (World Health Organization, 1990) maintain that breastfeeding reduces the incidence and severity of infectious diseases in babies, thereby decreasing rates of infant morbidity and mortality.

Similarly, findings from an analysis of data from the National Maternal and Infant Health Survey in the U.S. indicated that across all economic groups, exclusive breastfeeding for the first six months was associated with the lowest rates of infant illness for such things as diarrhea, coughs, colds, fevers, ear infections, vomiting, or pneumonia (Raisler, Alexander, & O'Campo, 1999). However, a similar protective effect was not found when breast milk made up less than half of all liquids and foods consumed in a one month period (Raisler et al., 1999).

In a report prepared for the World Health Organization, a comparable series of systematic reviews assessed the effects of breastfeeding on blood pressure, diabetes, cholesterol, obesity and intellectual performance of children (Horta, Bahl, Martines, & Victora, 2007). Findings indicated that those who were breastfed had lower blood pressure, lower cholesterol, were less likely to be obese, less likely to have type 2 diabetes, and have higher scores in intelligence tests in childhood. However, results from this study regarding intellectual performance differed from those of Ip et al. (2007) where no evidence to support an association between breastfeeding and cognitive performance was found in children. Although Horta et al. (2007) identified a potential

biological mechanism for improved intellectual development through the chemical properties of breast milk, as well as the added effects of maternal-infant bonding, the study results differed. This variation in findings may be due to the different number of studies reviewed by each team, their inclusion and exclusion criteria, the definitions of breastfeeding, the amount of parental stimulation children received, the socioeconomic background of parents, the different tests used to measure intelligence, and the different age ranges tested. Despite this particular finding, the benefits of breastfeeding have been shown to be substantial for both women and their children.

As well as health benefits for infants, there are also benefits for the health of women and families. A history of breastfeeding is associated with “a reduced risk of type 2 diabetes, breast, and ovarian cancer” in women (Ip et al., 2007, p. v). Other maternal health benefits include reduced postpartum bleeding, and delayed fertility, which reduces risks associated with short birth intervals (Leon-Cava, Lutter, Ross, & Martin, 2002). The Innocenti Declaration (World Health Organization, 1990) recognizes that breastfeeding provides economic and social benefits to the family, and the nation. As well as being safe and healthy, breastfeeding is the least expensive option (Leon-Cava et al., 2002) despite the need for breastfeeding women to have extra calories from food, saving an estimated \$1500 per year in formula and feeding supplies, as well as indirect savings through fewer days away from work attending to sick children (Association of Women's Health & Neonatal Nurses, 2015). In addition to advantages for infants and women, breastfeeding has environmental benefits as a renewable resource, generating no waste (Association of Women's Health & Neonatal Nurses, 2015).

Breastfeeding also provides psychosocial benefits by enriching the bond between mother and infant through ongoing contact (Association of Women's Health & Neonatal Nurses, 2015), and appears to have additional protective effects in the realm of child maltreatment (Strathearn et

al., 2009). In a blinded, prospective cohort study, 5890 mother-infant pairs in Australia were monitored over a period of 15 years to examine the relationship of breastfeeding to child abuse (Strathearn et al., 2009). The findings clearly demonstrated that a lack of breastfeeding substantially increased the odds of maternal maltreatment, particularly child neglect. Compared with children who were breastfed for four months or more, there was a nearly fourfold increase in the odds of maternal neglect for children who were not breastfed.

Another interesting finding from this study was that variables such as unmarried status, low maternal education, prenatal unemployment, smoking or binge drinking during pregnancy, prenatal anxiety symptoms, and maternal-infant separation six months after delivery were all independently associated with maternal maltreatment. Results showed that breastfeeding rates among these groups were lowest, suggesting the possibility that breastfeeding provides additional protective factors (Strathearn et al., 2009). Overall, results from this study indicate that breastfeeding may help to protect against child maltreatment perpetrated by mothers, and that there is a greater chance of maltreatment as the duration of breastfeeding decreases. Crittenden (as cited in Strathearn et al., 2009) suggests that one of the underlying causes of child neglect is an inability to form relationships. Strathearn et al. (2009) submit that breastfeeding may be important in the development of a secure relationship between mother and infant through responsive touch, eye contact, and physiological responses to prolactin and oxytocin. With breastfeeding rates being the lowest among women at highest risk for maltreatment, this study provides further evidence to support breastfeeding on a much broader scale, and particularly among the population of perinatal women negatively affected by the social determinants of health (Strathearn et al., 2009).

### **Breastfeeding and the social determinants of health.**

Social determinants of health appear to have an influence on the initiation and duration of breastfeeding for women. The social determinants of health are those social and economic conditions that influence the health of individuals and communities, and include factors such as housing, employment, income, food security, and conditions of childhood (Raphael, 2004). In addition to outlining a range of evidence-based benefits of breastfeeding for both infants and mothers, the American Academy of Pediatrics also notes clinically significant sociodemographic and cultural differences in initiation rates of breastfeeding in the United States, with lower rates particularly among low-income women under the age of 20 years (Eidelman & Schanler, 2012).

This finding is reinforced by a Cochrane Review that examined interventions to provide extra support for mothers, noting that “infant feeding is strongly related to inequalities in health and far from being an individual decision made by each woman, is influenced most strongly by structural determinants of health” (Renfrew et al., 2012, p. 3). These structural determinants include societal norms, public policy, and the availability of both professional and lay support (EU Project, 2004). Where breastfeeding is not commonplace women may find it socially challenging to breastfeed, lacking support to continue (Renfrew et al. 2012). Young mothers, those from low-income groups, and those with less education are less likely to initiate breastfeeding, or to continue for the optimal length of time to get the greatest health benefit (Bolling, Grant, Hamlyn, & Thornton, 2007). So, while breastfeeding is clearly important for the health of all mothers and infants, it seems that certain populations of perinatal women have lower rates of breastfeeding initiation and duration, and therefore greater need of support from professionals as well as from the community.

In a quest to determine the characteristics of those who are less likely to breastfeed their

infants, a U.S. quantitative study using data from the Pregnancy Risk Assessment and Monitoring System (PRAMS) was done to examine the percentages of all women who began breastfeeding and continued for various periods of time (Ahluwalia et al., 2005). Results indicated that women under age 25 were less likely to start and continue breastfeeding than older mothers (Ahluwalia et al., 2005). Others less likely to breastfeed include those with an incomplete high school education, smokers, those exposed to second hand smoke, unmarried women, mothers of low birth weight infants, and mothers attending the US based Women, Infants, and Children (WIC) supplemental nutrition program. The reasons mothers gave for stopping breastfeeding included poor milk supply, sore nipples, and the perception that baby was not getting enough milk. General conclusions were that these mothers needed extensive support to initiate and continue breastfeeding (Ahluwalia et al., 2005).

There are many factors that influence the decision to initiate breastfeeding, particularly for the population of women negatively affected by the determinants of health. A Scottish study evaluating the role of knowledge and social influences on the beliefs and intentions of adolescents regarding breastfeeding found that these influences are important predictors of positive understandings and intention to breastfeed in the future (Swanson, Power, Kaur, Carter, & Shepherd, 2005). In the United Kingdom, where the initiation of breastfeeding among the general population in 2010 was 81% (Unicef United Kingdom, n.d.), and rates for young women were very low at 51%, the value of breastfeeding-related health outcomes in decreasing health inequities has been recognized (Dyson, Green, Renfrew, McMillan, & Woolridge, 2010). As a result, the National Health Service aims to increase breastfeeding initiation particularly among disadvantaged groups (Dyson et al., 2010). A mixed methods study examining the factors influencing infant feeding plans for pregnant women under age 20 found that personal feelings

and individual beliefs about bottle-feeding or breastfeeding were the most predictive variables that influenced the choice of infant feeding (Dyson et al., 2010). Within this group of teen mothers a negative opinion of breastfeeding was found to be widely held (Dyson et al., 2010). This study revealed that within this group of mothers from four large cities in England, there was a culture of resistance and hostility against those mothers who chose to breastfeed, suggesting that cultural norms surrounding infant feeding play a major role in the choice of infant feeding. Similarly, an interpretive descriptive study in Ireland involving socio-economically disadvantaged women revealed that embarrassment and stigma regarding breastfeeding in public were seen as barriers (Shortt, McGorrian, & Kelleher, 2013). These mothers also saw breastfeeding as inconvenient and requiring considerable determination, and identified a lack of practical knowledge and support as influences on their decisions to stop breastfeeding when problems were encountered.

Other studies support both the significance of cultural influences, and the lack of social and professional support as barriers to breastfeeding (Beattie-Fairchild, 2013; Swanson & Power, 2005). Issues of community support were also found in a systematic review of qualitative research articles regarding the breastfeeding experiences of disadvantaged mothers (MacGregor & Hughes, 2010). These researchers found that perceived barriers to breastfeeding often superseded knowledge of benefits, and that social support networks and prior exposure to breastfeeding influenced infant feeding decisions (MacGregor & Hughes, 2010). The importance of prior exposure to breastfeeding was also noted in a study on low-income American women, which found that initiation of breastfeeding was positively associated with the mother herself having been breastfed, and having had the experience of breastfeeding an older child (Meyerink & Marquis, 2002). Moreover, in another systematic review, Hall Moran,

Edwards, Dykes, and Downe (2007) found that emotional support from nursing staff in the form of caring, empathy, concern, encouragement and a positive approach, as well as peer support were most helpful to teens, as was the continuity of support from a lactation expert who was also skilled at working with teens.

Skilled healthcare providers and community supports are an essential part of a strong breastfeeding culture. A Cochrane review of support for breastfeeding mothers with healthy term babies reinforced findings that breastfeeding support was more likely to be effective in settings where there 80% or more of women initiated breastfeeding, reflecting a strong breastfeeding culture (Renfrew et al., 2012). This review also suggested that strategies involving face-to-face support were more successful for exclusive breastfeeding than telephone support alone (Renfrew et al., 2012). Further findings from this review indicated that breastfeeding support offered only when women seek help is unlikely to be effective, therefore support should be offered through ongoing visits on a routine basis, so women can predict when help will be available (Renfrew et al., 2012). So not only are community supports and services important, but the nature and availability of those services are also critical.

Other factors influencing the initiation and duration of breastfeeding involve the personal motivation and confidence of women. A qualitative descriptive study of breastfeeding experiences exploring the perceptions of low-income women regarding incentives and disincentives to breastfeeding found that women fell into one of three groups: extrinsically motivated through external encouragement, intrinsically motivated through their own intentions, and successfully experienced in breastfeeding with both kinds of motivation (Racine et al., 2009). Further findings indicated that those women considered to be extrinsically motivated were the least likely to breastfeed successfully even with instruction and support, while those

considered successfully experienced were most likely to breastfeed up to six months. Intrinsically motivated women needed more instruction and information to breastfeed longer (Racine et al., 2009). Overall the researchers felt that this framework would provide guidance to healthcare providers regarding the amount of support required by different mothers.

Similar findings emerged in a prospective correlational study examining the influence of adolescent mothers' breastfeeding attitudes and confidence on initiation and duration of breastfeeding (Mossman, Heaman, Dennis, & Morris, 2008). Results showed that mothers with a higher sense of self-efficacy were more likely to continue breastfeeding until at least four weeks postpartum (Mossman et al., 2008). Providing support early in pregnancy related to breastfeeding is another important consideration for healthcare providers.

Wambach and Cohen (2009) found that those women who made the decision early in their pregnancy to breastfeed had a longer duration of breastfeeding. This study also found that difficulties with the mechanics of breastfeeding in the first few weeks were common among those mothers who weaned in the first few weeks postpartum, and that coupled with low motivation or inability to seek support also contributed to early weaning. Given that this population of perinatal women tends to have lower rates of breastfeeding initiation and duration, each of these studies has implications for PHNs and other healthcare professionals.

### **The role of PHNs in supporting breastfeeding.**

Research has shown that PHN involvement with perinatal women negatively affected by the social determinants of health can make a positive difference in breastfeeding outcomes (Fetrick et al., 2003; Kemp et al., 2011; Kitzman, Olds, Henderson, Hanks, Cole, Tatelbaum, McConnochie,... Barnard, 1997; Mejdoubi, van den Heijkant, van Leerdam, Crone, Crijnen, & HiraSing, 2014; Pugh, Milligan, Frick, Spatz, & Bronner, 2002). Although such PHN services

differ in their organizational structure and support, as well as local community culture, the ongoing contact and relationship development between PHNs and mothers has shown to be effective (Fetrick et al., 2003; Kemp et al., 2011; Koniak-Griffin et al., 2002; Leahy-Warren, Mulcahy, Phelan, & Corcoran, 2014; Olds et al., 2004; Olds, 2006; Olds, Kitzman, Cole, & Robinson, 1997; Pugh et al., 2002).

One of the leaders in this field of research has been Dr. David Olds and the Nurse-Family Partnership program (NFP). This American-based program was designed for young, low-income, first time mothers, and is currently delivered by PHNs (Kitzman et al., 1997; Olds, 2006; Olds et al., 1997). One of several randomized controlled trials examining the NFP program looked at the effect of prenatal and infancy home visitation by PHNs in Memphis, Tennessee, and replicated a similar study in Elmira, New York (Kitzman et al., 1997). In this study, 1139 women were randomized to one of four treatment conditions ranging from usual care to the full Nurse-Family Partnership program. Results from this study showed that women in the full NFP program attempted to breastfeed more frequently, although there were no differences in breastfeeding duration (Kitzman et al., 1997). These women were also more likely to use other community services than women in the control groups (Kitzman et al., 1997). Over several decades this program has shown ongoing success in achieving improved parental care of children as well as improved maternal life course, which involves aspects of education, work, fertility, and relationships with partners (Olds et al., 2004).

Although these are important and significant findings, it should be noted that there are some essential differences between the NFP program and the day-to-day practice of PHNs in BC. First, NFP is a research program, which follows a strict set of service delivery protocols. Nurses involved in delivering the NFP program receive additional training beyond that of nursing

colleagues working outside of the program. As well, these nurses have limited caseloads and a more intense level of supervision and support for managing challenging client situations (Olds et al., 1999). The women selected to participate in NFP must be first time mothers, and be below a certain age and income level. Data collected for NFP comes from a variety of sources, including interviews with women involved in the program, and specially designed data collection tools (Olds et al., 1999).

These are important differences in relation to routine PHN practice in BC. PHNs in day-to-day practice are not all trained to the same standard for this particular type of service. Their caseloads may involve a wider range of responsibilities, such as communicable disease follow-up or school health, and may reflect larger caseloads with many more families to follow, all of which affects their ability to provide intense service to individual families. As well, the nature of PHN interventions in routine practice are more closely aligned with the PHN intervention wheel model (Olson-Keller et al., 1998, 2004), which identifies community and systems level interventions, as well as individual level interventions. Another difference is the nature of the priority perinatal population that PHNs follow, which is broader than that of the NFP program. In BC, PHNs are expected to visit multiparous as well as primiparous women, and those women might be of any age, or any income level. Levels of PHN supervision are more diffuse, and may not always provide the same level of expertise and support for PHNs dealing with difficult family situations. And lastly, the process of data collection in the routine practice of PHNs is confined to the integrated public health information system, which has limitations related to data quality and consistency. Together these factors set PHN practice apart from many of the research projects addressing this population, and will provide a basis for consideration in the analysis of all the literature to be reviewed in this chapter.

In a project more closely reflecting routine practice, Fetrick et al. (2003) examined the relationship between PHN contact and breastfeeding rates among high-risk antepartal mothers through a chart review of 55 clients. Their findings indicated that mothers who received between five and nine PHN visits had more successful rates of breastfeeding than those who received fewer than five PHN visits. Although this seems like a promising finding, the definition of ‘high-risk’ was vague, and simply described as being consistent with other home visitation programs in the United States. There was no mention of limitations such as the involvement of only primiparous women younger than 19 years, which seems to be characteristic of other PHN home visiting programs (Koniak-Griffin et al., 2002; Olds et al., 2004). In addition to these issues, there was little discussion about the duration of breastfeeding achieved as a result of PHN contact.

Despite these considerations, other randomized controlled trials have also found longer durations of breastfeeding when PHNs are involved with this population of perinatal women (Kemp et al., 2011; Pugh et al., 2002; Shah & Austin, 2014). An Australian randomized controlled trial compared a long-term nurse home visiting program embedded within a universal system for child health with the usual universal care (Kemp et al., 2011). In this study 208 at risk, socially disadvantaged mothers participated, with 111 in the intervention group, and 97 in the control group. Results showed that children in the intervention group, with long-term nurse follow-up, were breastfed for significantly longer than women in the comparison group (Kemp et al., 2011). Study interventions began, on average, at 26 weeks gestation, and continued until the child’s second birthday. A variety of outcomes were tracked, some of which were measured by maternal self-report, and others by established tools such as the Edinburgh Depression Scale (Kemp et al., 2011).

A weakness of Kemp's project was that it involved only three PHNs. Given the importance of relationship building, identified by nursing theorists Falk-Rafael (2005) and Watson (1999/2012), the effect of a larger team of PHNs may have been different. Kemp et al. (2011) noted that restricted funding for their study limited the number of nurses participating and hence the number of mothers involved, with the result that there was reduced capacity to assess the effectiveness of the programs for women with more complex risks such as drug or alcohol issues. In addition, this project did not discuss the broader range of PHN interventions that may have been a part of usual care, such as those identified by the PHN intervention wheel model (Olson-Keller et al., 1998, 2004), which includes community and systems level activities. Regardless of these weaknesses, this study more closely reflected the routine practice of PHNs compared to more structured research projects.

In a more defined approach, an American randomized clinical trial considered the effects of PHN involvement with 41 low-income women (Pugh et al., 2002). Findings from this study demonstrated that compared to regular support from hospital nurses, along with the availability of telephone resources and possible visits from a lactation consultant, those receiving supplementary visits from a community health nurse and peer counselor support through telephone calls, had longer breastfeeding duration. The sample size of 41 involved 21 mothers for the intervention group, and 20 mothers receiving usual care (Pugh et al., 2002). The authors noted that with the small sample size the differences were not significant, but rather only indicated a positive trend (Pugh et al., 2002). Added to this is a concern about the nature of the data collection for both groups. Information about breastfeeding was gathered through biweekly telephone contacts for the six-month period of the study. The lack of significant difference between the two groups may have been influenced by the data collection method itself, which

could have been considered an intervention by virtue of someone calling to enquire about breastfeeding. Although this study did not demonstrate significant findings, the results showed a positive trend in breastfeeding duration with PHN intervention.

Another study involving PHNs as well as other supports, involved a secondary data analysis of Virginia PRAMS data, looking at information about women who had been part of a prenatal home visiting program (Shah & Austin, 2014). Results demonstrated that home visiting services during pregnancy were associated with an increase in breastfeeding initiation, although details regarding the type of visiting program, the length of participation, the frequency of visits, or the nature of the community culture of breastfeeding were not presented (Shah & Austin, 2014).

However, not all studies reflect such a positive view of nursing support. A randomized controlled trial by Armstrong, Fraser, Dadds, and Morris (2000) assessed the effectiveness of home-based interventions for 160 vulnerable postnatal families in Australia. Based on a power analysis, the sample size was considered more than adequate. The intervention group received weekly, biweekly, and eventually monthly visits by child health nurses with a program similar to that of BC PHNs. The control group was offered the opportunity of a home visit, along with the ability to request more visits if desired. Although the focus was primarily on maternal-infant interaction, other preventive health measures were also examined including immunizations, smoking, and breastfeeding. Although study results only extended to 4 months postpartum, breastfeeding rates between the two groups did not show any difference. No mention was made about how high, or low, those rates may have been, or how they compared to the wider population of mothers. Discussion about routine PHN services including caseload expectations for intervention nurses, and available community resources, were not included. In some of the earlier studies reviewed, PHN caseloads were limited thereby allowing more time to focus on

participants (Kemp et al., 2011; Olds et al., 1999). The availability of community resources, including routine PHN support for all mothers, as well as information on the community culture of breastfeeding could have had an impact on the lack of difference between the two groups particularly if breastfeeding rates were already high. As identified earlier, a strong breastfeeding culture and the availability of resources has been shown to make a positive difference to rates of initiation and duration of breastfeeding (Renfrew et al., 2012).

Similarly, in a controlled trial to assess the effectiveness of postnatal home visits to teen mothers, no significant difference was found in breastfeeding rates at six months (Quinlivan, Box, & Evans, 2003). Depending on the local community rates of breastfeeding, this could be seen as a positive outcome, as teen mothers are not expected to breastfeed as long as older mothers. Although the nurse-midwife role in this study was similar to that of PHNs, there was no information provided about the level of breastfeeding knowledge and skill of the intervention nurses, or about the prevailing community culture related to breastfeeding, both of which could affect the outcome. Results that indicate no difference between the control and intervention group, without relating findings to the larger community rate of breastfeeding, fail to fully recognize the effect of the intervention.

In a critical review of 18 randomized trials evaluating breastfeeding interventions related to minority or low-income women, Chapman and Perez-Escamilla (2012) found that postpartum support delivered by PHNs alone was the least effective type of intervention compared to peer counseling, group education, breastfeeding clinic support, or supplemental nutrition programs. This review, however, did not discuss the nature of the nursing interventions, nor the level of training nurses had. Nor did this review discuss the effect of community culture and how a range of informal community supports may have affected their findings.

As noted earlier, a supportive community breastfeeding culture seems to have a strong influence on the initiation and duration rates of women in the perinatal nursing priority population. A synthesized review of 18 studies reinforced the importance of social support for adolescent mothers by nurses in the postpartum period, which affected positive experiences related to breastfeeding (Grassley, 2010). Many of the studies examining the effect of PHN involvement on breastfeeding lacked discussion about the wider breastfeeding culture of the communities involved, and nor was there any discussion about the broader community-based activities, which PHNs often initiate, and in which they participate.

A broader range of PHN activity can both help and hinder efforts to support women in the perinatal period. When PHNs spend time on many different job duties, such as communicable disease follow-up, they have less time to focus on priority perinatal women. On the other hand, the ability of PHNs to be involved in community and systems level interventions helps to shift prevailing attitudes and culture related to breastfeeding. Where PHN breastfeeding supports are an ongoing resource to all new mothers, a level of community expertise and support gradually develops, leading to stronger peer and intergenerational support. In many instances PHNs play a role in helping to develop community level supports, such as breastfeeding clinics, parenting groups, and other programs that strengthen healthy lifestyles including breastfeeding (Community Health Nurses of Canada, 2009). However, outside of specialized research projects, in day-to-day practice, PHN time as a resource is often diverted to other pressing priorities such as H1N1 outbreaks and mass immunization campaigns, leaving less time to focus on community breastfeeding activities. Few of these studies discussed the context in which the research took place, and while the randomized controlled trials identified various confounding variables, a reflection of routine PHN practice was not included. Despite these shortcomings, the

value of PHN involvement with the perinatal priority population is clearly supported in the research literature, and welcomed by many women.

### **The perspective of mothers.**

A number of qualitative studies have reflected the significant role that PHNs play in supporting women to breastfeed their infants successfully. In many cases women have appreciated and valued the involvement of PHNs, however in some situations it has not been as welcomed. Regardless, both perspectives provide lessons to be learned and incorporated into practice.

Women involved with the NFP program highlighted the importance of the nurse's personality, friendship, respect, expertise, and trustworthiness in a qualitative case study conducted by Kurtz Landy, Jack, Wahoush, Sheehan, and MacMillan (2012). The importance of fostering a trusting relationship between mothers and nurses was also identified in an American ethnographic study of low-income black women, who valued and trusted the personal connections with healthcare providers (Cricco-Lizza, 2006). Key findings from another qualitative study of 42 low-income mothers identified the importance of health care providers who were helpful, knowledgeable, and enthusiastic about breastfeeding, made home visits, established supportive relationships, made appropriate referrals, and helped with actual breastfeeding problems throughout the perinatal period (Raisler, 2000).

A Canadian grounded theory study involving eight teenaged mothers also identified the powerful influence of health professionals including PHNs in initiating and continuing breastfeeding (Nelson & Sethi, 2005). Important themes identified by these teens about health care providers included taking time, being personal, being patient, listening, and understanding (Nelson & Sethi, 2005). Although limited in numbers, the comments of adolescents in this study

reflect similar findings from other research projects, and suggest the need for PHNs to provide ongoing contact to mothers within the priority nursing population who may be less likely to be successful with breastfeeding.

Another group of 90 American adolescent mothers expressed the need for nurses to take more time to support them in breastfeeding; to answer their questions rather than just being told information; to take time to show them how to breastfeed; and to support them in their efforts in a respectful, calm, consistent, and encouraging way (Pentecost & Grassley, 2014). As with other studies, this research also identified the nursing behaviours that teens most valued, and that positively influenced their decisions to continue breastfeeding. Additionally, a group of Canadian adolescent mothers highlighted the importance of nurses actively engaging teens in the pre- and postnatal periods, linking them to supportive networks and community resources, and providing positive reinforcement of breastfeeding knowledge, skills, and successes (Nesbitt, Campbell, Jack, Robinson, Piehl, & Bogdan, 2012).

Despite the many positive attributes of nurses identified by mothers, there were also some notable concerns expressed about which PHNs should be aware. Unhelpful nursing actions identified by some women included missing opportunities to talk about breastfeeding, providing misinformation, encouraging the use of formula, providing perfunctory care, and not providing assistance in accessing other supports (Raisler, 2000). One qualitative study from the UK found that mothers viewed health visitors (PHNs) as spying on them and feared that nurses might report them to Social Services as being a poor mother (Dyson et al., 2010). In this case, PHNs were not seen as being a support to teen moms. Much seems to depend on the nature of PHN involvement with women, and reflects the importance of developing a trusting relationship as conceived by Falk-Rafael (2005) and Watson (1999/2012). When a trusting relationship is

developed over time, when the range of support is broad encompassing multiple topics, and when the community culture is supportive, then breastfeeding is more successful for women who are negatively affected by the social determinants of health.

### **Breastfeeding, priority populations, and PHNs: A Summary.**

Despite the acknowledgement that breastfeeding is important for the health of women and infants, certain populations continue to have lower rates of initiation and duration. It is this population to whom PHNs give priority in focusing their efforts. Research has shown that when PHNs are involved with these women, breastfeeding is initiated more often and continues for longer periods of time (Fetrick et al., 2003; Kemp et al., 2011; Pugh et al., 2002).

However, what is not well understood is how PHNs are able to support breastfeeding within the context of everyday practice. Findings from many of the studies discussed fell short in addressing the wider and very complex contexts in which women make infant feeding choices, and in which PHNs work to support them in these decisions. PHNs bring attention to a range of health issues when working one-to-one with mothers, and PHNs also engage in larger community level activities to address and support these health issues. All of this is done within a context of changing organizational demands and workload priorities, such as influenza campaigns, and H1N1 outbreaks. A few of the studies discussed above have been based on real life experiences of PHNs, however many others have been designed as randomized controlled trials with limitations in subject characteristics, time frame, or PHN workload.

Much of the research discussed fails to take account of the broader role that PHNs play within communities in support of breastfeeding. In some cases, the randomized controlled trials discussed above limited the characteristics of participants reflecting a much narrower slice of the priority perinatal population, and eliminating women who may be in need of greater support,

such as a 17 year-old with a second or third child, or an impoverished 28 year-old experiencing a first pregnancy. At the same time, some research trials also limited the job duties of PHNs without acknowledging the wide range of organizational expectations and influences, as well as budgetary and political restraints that affect the real-life practice of PHNs (Kemp et al., 2011; Kitzman et al., 1997; Olds et al., 1999).

None of the studies included in this review discussed the wide range of influences that PHNs have in working with both individuals and communities, and how that influence can build over many years (Kemp et al., 2011; Kitzman et al., 1997; Olds, 2006; Olds et al., 1997; Pugh et al., 2002; Shah & Austin, 2014). From my experience, PHNs who become certified lactation consultants, established free breastfeeding clinics, enabled parent support groups, sponsored breastfeeding week campaigns, incorporated into practice principles of the WHO Baby Friendly initiative, and rallied the community to support breastfeeding in public settings, all contributed to a positive shift in culture. In addition, the influence of the many other players in the health care system with whom PHNs collaborate, as well as community partners and support systems, was not recognized in many of these research projects (Kitzman et al., 1997; Olds, 2006; Olds et al., 1997; Pugh et al., 2002; Shah & Austin, 2014). Although PHNs have been shown to be effective, and are in an ideal position to continue promoting, supporting, and protecting breastfeeding for generations to come, little is known about how interventions in the context of day-to-day practice, and at all three levels of practice, can make a positive difference in the breastfeeding outcomes of the population of priority perinatal women.

## **Tobacco**

Tobacco use during pregnancy remains a major cause of maternal, fetal, and infant morbidity and mortality (U.S. Department of Health and Human Services, 2014). The Surgeon

General's report (U.S. Department of Health and Human Services, 2014), and other researchers observe that infant mortality is increased among women who smoke during pregnancy, and that evidence is sufficient to infer a causal relationship between maternal smoking and fetal growth restriction, low birth weight, preterm delivery, premature rupture of membranes, placenta previa, placental abruption, orofacial clefts, reduced infant lung function, preterm-related deaths, and sudden infant death syndrome (Dietz et al., 2010; Salihu & Wilson, 2007; U.S. Department of Health and Human Services, 2014). Other effects of prenatal exposure to tobacco have been correlated to learning difficulties, memory problems, hearing deficits, attention deficit hyperactivity disorder, conduct disorders, lower intelligence levels, obesity, and offspring initiation and onset of regular smoking (Agrawal et al., 2010; Mamun, O'Callaghan, Williams, & Najman, 2012; Rosenthal & Weitzman, 2011).

#### **Tobacco use and the social determinants of health.**

The U.S. Surgeon General's Report (U.S. Department of Health and Human Services, 2014) indicates that women most likely to smoke are often those disadvantaged by low income, low education, and mental health issues. At the same time, these women are less likely to quit smoking during pregnancy, and more likely to relapse if they do quit (U.S. Department of Health and Human Services, 2014). A review of the U.S. Pregnancy Risk Assessment Monitoring System (PRAMS) also found that smoking rates were higher among the working poor and those of low income (Adams et al., 2008). In addition, the review found that these women often have a greater range of individual and family problems including abuse, drug and alcohol problems, unintended pregnancy, and a lack of medical insurance (Adams et al., 2008). Similar results were found in BC through a retrospective study of births from 2001-2006 using records from the BC Perinatal Database Registry (Erickson & Arbour, 2012). Self-reported smoking data showed

that heavy smokers were more likely to have incomplete high school education, be a single parent, be multiparous, to have indications of alcohol or drug use, and to have had fewer than four prenatal care visits (Erickson & Arbour, 2012). The authors concluded that heavy smoking in early pregnancy could be used as a marker for other lifestyle risk factors (Erickson & Arbour, 2012).

It turns out that the population of perinatal women most likely to smoke during pregnancy is similarly affected by the social determinants of health as women who are less likely to breastfeed. An interesting connection was noted between perinatal smoking and breastfeeding status where smokers were less likely to be breastfeeding by eight weeks postpartum than non-smokers (Hill & Aldag, 1996). Similar connections were also noted by Ratner, Johnson, Bottorff, Dahinten, and Hall (2000) who found that women who breastfed and had good mental health were less likely to relapse to daily smoking. Both smoking and breastfeeding are subjects of concern for PHNs.

#### **The role of PHNs in tobacco cessation.**

Despite the risks of smoking, cessation during pregnancy has been associated with improved fetal growth and reduced preterm delivery (Baba, Wikstrom, Stephansson, & Cnattingius, 2012; McCowan et al., 2009). Efforts to support cessation in pregnancy are not the exclusive realm of PHNs, as women are influenced by a variety of healthcare providers as well as family and community influences. However, PHNs have a unique opportunity to support cessation efforts with perinatal women through their ongoing connections with individuals, families, and communities.

There have been few studies done that specifically identify the effectiveness of PHNs in prenatal smoking cessation. Of those, the NFP program discussed above found a 75% reduction

in the incidence of low birth weight among women who smoked and who were visited by PHNs (Olds, Henderson, Tatelbaum, & Chamberlin, 1986). Further research with this program revealed that NFP participants showed a higher rate of smoking cessation, with a stronger effect in a later implementation period (Matone, O'Reilly, Luan, Locallo, & Rubin, 2012). It should be noted, however, that the NFP program does not reflect the typical practice of PHNs, as the NFP program involves smaller caseloads, closer supervision, and additional training for PHNs (Olds et al., 2002). In Canada, PHNs are often involved in a broader range of practice that includes working with families, health care partners, and communities (Canadian Public Health Association, 2010; Community Health Nurses of Canada, 2011), and these factors may also influence the effectiveness of cessation efforts by PHNs. A further study from the Netherlands based on the NFP model also showed promising results in both tobacco cessation and reduction (Mejdoubi et al., 2014), and like other NFP studies, this project also used specially trained nurses, in this case midwives, along with a program of universal perinatal care for all women. However, the impact of routine PHN practice on tobacco cessation is not clear.

In a somewhat different approach, a Canadian randomized controlled trial sought to assess the effectiveness of two PHN interventions aimed at smoking cessation for pregnant women, which included either an evening class or individual counseling by PHNs (O'Connor et al. 1992). Although no women actually attended the evening class, the group receiving individual counseling had two to three times higher rates of cessation at six weeks postpartum compared to the control group (O'Connor et al. 1992). This study involved the use of PHNs in regular practice, however, six weeks is a very short time to measure ongoing cessation success, so it would have been interesting to see if these women were able to continue not smoking for longer periods.

Despite these findings, not all efforts by PHNs to support perinatal smoking cessation have been effective. A study involving early intense home visitation by PHNs with pregnant adolescents found that tobacco use was significantly increased from pregnancy to one year postpartum, although rates remained lower than before pregnancy (Koniak-Griffin et al., 2002). A Canadian randomized controlled trial seeking to improve community-based pregnancy care for women with increased risk factors found that the involvement of a study nurse and a home visitor produced no differences in smoking (Johnston, Tough, & Siever, 2006). The nurses involved in this project were experienced PHNs with additional training in the areas of pregnancy, counseling, learning, and various theoretical approaches. Although their role was limited to the study population within a clinic setting, without the pressures of competing demands (Tough et al., 2006), it appears that even with the time available to focus on tobacco cessation, PHNs were unable to make gains in this area. This project occurred over a three-year period, and did not involve broader community-based measures related to tobacco use or other health issues. As well, the design of this study, based in a physician run maternity clinic, had the effect of changing the current standard of practice in that office by introducing a new intervention to all practitioners, which may have affected the interpretation of outcomes in this trial. Although findings from this project concluded that there were no differences in smoking between women with risk characteristics and those without, women involved in the nurse intervention group were more likely to use community-based resources (Tough et al., 2006). This is a positive achievement in other respects, even though tobacco reduction was not influenced by PHNs.

In a randomized controlled trial discussed earlier in relation to breastfeeding, Armstrong et al. (2000) implemented a structured program of visits from child health nurses, which involved

the establishment of a trusting relationship with mothers, enhancement of parental confidence and self-esteem, anticipatory guidance, promotion of preventive health care, and facilitation of access to other community services. Although actual rates of tobacco cessation were not measured in this study, self-reported changes in parental smoking behaviour indicated a positive shift by considering children's exposure to second hand smoke. Findings showed a significant difference in parental smoking behaviour with fewer of the PHN intervention group smoking inside the house. This study reinforced the importance of PHNs to establish a trusting relationship with women, and to consider tobacco reduction strategies that fit the unique needs of individual women and their families.

#### **The perspective of mothers.**

From a more individual perspective, a qualitative Australian study explored the views of women who smoked during pregnancy, and found that a more empathetic approach, which acknowledges women's concerns about harming their babies and themselves, may be more effective than a punitive approach from healthcare providers (Wigginton & Lee, 2013). This group of women also suggested the need for support in cessation efforts for themselves, as well as for family and friends, to create smoke free environments. These women proposed that the creation of a more positive social environment with fewer negative and coercive approaches from healthcare providers and others would be more supportive of cessation efforts for pregnant women (Wigginton & Lee, 2013). These findings reinforce the significance of a trusting relationship with PHNs, and emphasize the importance for PHNs to have adequate knowledge regarding tobacco cessation approaches not just for mothers, but for those surrounding them as well.

However, even the identification of smokers can be a challenge. In a qualitative study from

the UK discussed earlier, young mothers admitted they were reluctant to disclose their smoking habits to health visitors (PHNs), fearing that their smoking might cause them to be reported to Social Services as unfit mothers (Dyson et al., 2010). This situation could make it difficult for PHNs to support cessation efforts, although the development of a trusting relationship with PHNs might provide opportunities for discussion about smoking reduction or cessation, and provide opportunities to address family or community influences.

### **Implications for PHNs.**

Although not specifically focusing on PHNs, research involving nurses from a variety of settings has also shown some effectiveness in cessation efforts (Albrecht et al., 2006; Avidano Britton, Brinthead, Stehle, & James, 2006; Bullock et al., 2009; Ershoff et al., 1999; Gebauer, Kwo, Haynes, & Wewers, 1998; Ratner et al., 2000). Many of the features of these studies reflect similar activities that PHNs might be involved in during their day to day practice, although PHNs may be more likely to involve families and communities given their wider role. Regardless of these limitations, research involving nurses working with individuals has shown some limited success related to tobacco reduction and cessation. The common element in those studies seems to be the development of trusting relationships. Because of the independent nature of their practice, PHNs generally have the opportunity to spend additional time with women, and to develop the relationships that have been identified by researchers as being important to successful tobacco reduction or cessation strategies.

A significant trend in the effectiveness of nurse-led interventions looking at prenatal and postpartum smoking cessation outcomes was shown in a meta-analysis of 64 published studies (Gaffney, Baghi, & Sheehan 2009). Although many of these research projects did not focus on PHNs, the nursing interventions were ones that PHNs might employ in their work with perinatal

women who smoke. For example, guidelines such as the “5A’s” approach of the American Cancer Society could be used to engage pregnant smokers. The “5A’s” involves activities related to asking, assessing, advising, assisting, and arranging in relation to smoking (Fiore, 2008). However, sometimes interventions such as the 5A’s are not well used due, in part, to several provider-specific barriers including lack of knowledge about tobacco cessation counseling, low levels of confidence in personal intervention abilities, perceptions that clients were not interested, worry about causing guilt, and lack of time to get involved (Okoli, Greaves, Bottorff, & Marcellus, 2010).

Although not specific to PHNs, but clearly relevant, an integrative review by Chizimuzo, Greaves, Bottorff, and Marcellus (2010) examined how healthcare providers engage with pregnant smokers about cessation. This review, summarizing 28 research studies, found that although healthcare providers tended to inquire about smoking and advise pregnant women to quit, they did not as often assist in cessation or arrange further follow-up, and few used all the components of the 5A’s (Chizimuzo et al., 2010). It seems that effective approaches may not always be used consistently. Although PHNs may also fail to employ all components of the “5A’s”, they are in a better position than many health care providers to employ these techniques given their ongoing relationships with priority perinatal women.

A systematic review and meta-analysis of 59 studies regarding a range of smoking cessation interventions in pregnant and postpartum women found evidence that multicomponent approaches were more likely to be effective, but results were inconsistent (Likis et al., 2014). Among the components with a greater than 80% likelihood of success were information and personal follow-up (Likis et al., 2014). Although this review was not directed exclusively at nursing interventions, two of the more highly successful components, information and personal

follow-up, are features of ongoing PHN involvement with perinatal women (Likis et al., 2014).

Such involvement was identified in a Canadian longitudinal pilot study based on participatory action research and conducted by a team of 42 community members, healthcare practitioners, and research advisors with the purpose of developing, implementing, and assessing the feasibility of smoking cessation and relapse prevention interventions with perinatal women (Chalmers et al., 2004). The interventions were designed to be solution focused, emphasizing client self-assessment and control of the intervention process, as well as involvement of other participant-determined supports, such as partners or family, and community resources. These interventions included home visits and follow-up phone calls by nurses who assisted women to problem-solve and deal with particular situations, and who also provided resource materials and referrals to other community services for help with perinatal, family and financial concerns. Women evaluating the interventions found that the home visits and telephone calls were the most helpful, noting that the personal connection with the intervention nurse was important and valued. The overall effectiveness of this approach was not determined in this study; however, it is interesting to note that many of the activities involved in this project are similar to those of routine PHN work. Recognition of the influence of the social environment and links to community supports are all part of the larger realm of supports in which PHNs are often involved, and which all contribute to the larger community attitude toward smoking.

### **Community influences.**

The community culture of smoking has been found to have an effect on smoking cessation during pregnancy. Matone et al. (2012) conducted an inquiry into the influence of community rates of smoking on the effectiveness of home visitation programs in addressing prenatal smoking cessation. Using communities that had been involved with 24 NFP program sites

across Pennsylvania over a period from 2003 to 2007, this study used a retrospective cohort design to compare NFP clients with matched comparison women to assess smoking cessation in the third trimester of pregnancy (Matone et al., 2012). The study sample involved a total of 6,429 women. The comparison population was very similar to the NFP criteria focusing on young, first time, pregnant women who were smokers, and targeted similar neighbourhoods where NFP programs had been implemented (Matone et al., 2012). In this project, smoking cessation information was based on self-reports of zero cigarettes in the last three months of pregnancy as recorded on birth certificates. This was made possible by a 2003 revision to Pennsylvania's birth certificates, which now includes self-reported trimester-specific smoking behaviours (Matone et al., 2012). Information on the measure of the baseline county smoking rates for each area was also collected (Matone et al., 2012). Results of this inquiry showed that NFP clients experienced significantly higher rates of smoking cessation compared to the matched comparison groups (Matone et al., 2012). They also found that lower rates of community smoking were associated with higher rates of prenatal cessation.

The influence of community smoking levels has implications for aspects of PHN work involving broader community engagement, and is not often reflected in intervention studies. This broader community involvement might include PHN activities such as school-based tobacco prevention programs, work with community by-law development regarding smoking regulations, as well as ongoing prevention and support activities with other groups such as birth control clinic clients. Recognition of the influence of the social environment and links to community supports are all part of the larger realm of supports that PHNs are often involved with, as identified in the PHN intervention wheel model (Olson-Keller et al., 1998, 2004), and all of which contribute to the prevailing community attitude toward smoking.

### **Tobacco, priority populations, and PHNs: A summary.**

Pregnant and parenting women most likely to smoke are often those negatively affected by the social determinants of health (U.S. Department of Health and Human Services, 2014).

Smoking during pregnancy is a major cause of fetal, infant, and maternal morbidity and mortality (U.S. Department of Health and Human Services, 2014). Community levels of smoking can influence cessation during pregnancy (Matone et al., 2012). Through their broad range of interventions, PHNs have a unique opportunity to support individual women in their efforts to quit or reduce smoking, and they also have an opportunity to influence community culture related to smoking through a variety of health promotion efforts.

Several of the studies included in this review demonstrated that PHN involvement with priority perinatal women could make a positive difference in the reduction and cessation of smoking (Mejdoubi et al., 2014; Olds et al., 1986). Perinatal women who smoke identified the need for support in cessation efforts for themselves, as well as for family and friends, and particularly the need for more positive support from healthcare providers (Wigginton & Lee, 2013). Unfortunately, effective interventions, such as the “5A’s” approach, are sometimes not well used by healthcare providers due to a variety of personal and organizations factors (Okoli et al., 2010).

The effectiveness of PHNs in supporting smoking cessation for perinatal women requires further research; however, the research that has been done looking at a variety of approaches is encouraging. This optimism is supported by the nature of routine PHN work with a focus on individuals, families, communities, and systems (Olson-Keller et al., 1998, 2004). However, the efforts of PHNs to reduce or prevent smoking can be influenced by organizational constraints. In many cases, the research studies reviewed here involved nurses assigned exclusively to a time-

limited project, which meant that competing pressures from other job demands, and ongoing, long-term follow-up and engagement with the larger community were not considered. This makes it difficult to know what the effect of routine PHN practice on smoking cessation in this population might be. However, by virtue of their established role in communities, PHNs have the ability to establish trusting relationships with individuals and families, and at the same time, to participate in community development activities aimed at prevention, such as school-based tobacco prevention programs. Over time such activities may help to change the prevailing culture toward tobacco use.

### **Infant Immunizations**

Immunizations are an important, proven, and cost effective strategy to reduce the spread of life threatening vaccine preventable diseases (Public Health Agency, 2003; World Health Organization, n.d.). In BC, PHNs have been involved in the delivery of childhood immunizations since the 1940s (Green, 1984). Through their involvement with individuals and communities, PHNs play an important role in educating and encouraging new parents to ensure their children are fully immunized. Immunization rates are routinely monitored at the broad population level in BC, however smaller subsets of the population are not tracked, including the children of priority perinatal women who are less likely to be immunized.

#### **Infant immunizations and the social determinants of health.**

The Public Health Agency of Canada (2003) has identified populations with low socioeconomic status as being at greater risk of not completing the basic childhood immunization series. Several comprehensive studies based on the U.S. National Immunization survey of records for preschool children have identified a number of maternal factors most strongly associated with incomplete immunizations, including unfinished high school education;

being divorced, separated, or widowed, having multiple children; having an income below 50% of the federal poverty level; and being of black or Hispanic ethnic background (Kim et al., 2007; Luman, Mason McCauley, Shefer, & Chu, 2003). Falagas and Zarkadoulia (2008) had similar findings in their systematic review of research related to factors associated with poor compliance to vaccination in children. Results from these studies suggested that single motherhood and the presence of more than one child under the age of 18 years are associated with delays in completion of basic immunization series (Falagas & Zarkadoulia, 2008; Kim et al., 2007; Luman et al., 2003). Another American study of 54,429 children, designed to identify individual, provider, and community level factors that predict the probability of an infant being late to start immunizations, showed that the highest proportion of late starters were among children of younger mothers, those with no prenatal care visits, those with incomplete high school education, and mothers of three or more children (Feemster, Spain, Eberhart, Pati & Watson, 2009). Conclusions from this study highlight the important role that mothers play in ensuring their children are vaccinated, and the importance of addressing maternal concerns and barriers to obtaining immunizations, such as knowledge of and cost of healthcare services.

Other factors that stand out in relation to families where childhood immunization rates are low are larger family size and level of education. It is no surprise that the task of keeping track of immunization schedules for several children can be complex, not to mention the practical challenges of arranging appointments, taking time off work, and organizing trips to the clinic with several small children. Additionally, lower levels of education may affect parental knowledge and understanding about the nature of vaccines (Falagas & Zarkadoulia, 2008). However, research has shown that with support poorly educated and low-income mothers from some minority groups can be diligent in ensuring their children receive the recommended

immunizations (Kim et al., 2007).

### **The role of PHNs and immunizations.**

PHN involvement with high priority families seems to make a difference in childhood immunization rates. In a study by Koniak-Griffin et al. (2002), consideration was given to the impact on immunizations as part of an evaluation of an early intervention program using intense public health nursing care. This inquiry involved 144 pregnant primiparous adolescents who were randomized into either an early intervention program or to a traditional care group. The early intervention group received intense home visiting from pregnancy through to one year postpartum, while the traditional care group received routine PHN services involving one or two prenatal visits and one postpartum visit. Findings from this study demonstrated a range of positive effects including a statistically significant higher immunization rate among the early intervention group. Immunization rates, based on a review of infant immunization cards, revealed that in the group who had received intensive PHN visits, children had a 96% rate of complete immunizations at one year, while the children in the group who received traditional PHN services had a rate of 86% (Koniak-Griffin et al., 2002). Although the immunization rates for those receiving routine PHN care were high, the observation of even higher rates among those who were expected to have lower immunization rates, but who received intensive PHN care, may reflect the important element of relationship development.

Another facet of PHN involvement is the referral of families to other community resources. In a study based on the U.S. National Immunization survey, Luman et al. (2003) noted that because mothers play such an important role in ensuring their children are immunized, the familiarity with other community resources, as well as knowledge of and cost of services is an important component of success. In a randomized controlled trial involving both primiparous

and multiparous women considered to be at high risk, a structured program of visits from child health nurses was offered, which involved establishment of a trusting relationship, enhancement of parental confidence and self-esteem, anticipatory guidance, promotion of preventive health care, and facilitation of access to other community services (Armstrong et al., 2000). Although this study only extended to 4 months postpartum, findings indicated a significant difference in immunization rates with the intervention group having a higher mean number of completed immunizations.

Similar findings occurred in a program evaluation described by Schaffer, Goodhue, Stennes, and Lanigan (2012) where results showed positive immunization outcomes for a PHN visiting program for pregnant and parenting teens regardless of parity. In this outcome assessment evaluation, based on electronic health records, 95% of children were up-to-date on immunizations. Even though a statistical analysis of data comparing study participants to the general population was not included in this study, the results indicated that with more intensive PHN involvement, very high immunization rates were achieved for a group of teen mothers who would have been expected to have lower rates.

There were comparable findings in a descriptive study of 56 teen primiparous mothers in California exploring whether there was improvement in self-esteem, social support, and parenting competence when mothers were case managed by PHNs for the first 18 months postpartum (Herrmann, Van Cleve, & Levisen, 1998). As part of this study, infant immunizations rates were examined with the finding that over 90% of babies were up-to-date (Herrmann et al., 1998). Unfortunately, this study had a limited sample size, and did not use a control group, so the researchers may not have been able to consider the impact of PHN involvement in relation to similar mothers without the same support. Although there was no

discussion about how this rate may have compared to the general population of infants, the high immunization rate of 90% was a positive outcome considering the participants included mothers with other children.

Other studies involving PHNs and vulnerable perinatal women have shown less remarkable results associated with immunizations. A quasi-experimental study, now almost twenty years old, examined the effect of sustained nursing contact with socially high-risk primiparous and multiparous mothers in the U.S. (Barnes-Boyd, 1995). The nurses involved were not described as PHNs, but rather registered nurses with experience in inner city home health nursing with special training in infant care and development. Although immunizations were not a primary focus of this research, study findings indicated that both the intervention and control groups showed 80% immunizations up to date for age.

A weakness in this study was recognition that the control group actually received a certain amount of intervention by virtue of visits and phone calls for the purpose of data collection. In addition, the authors of this study did not relate immunization rates achieved to those of the general population, which may or may not have been of a similar level. Also missing from this discussion was information about the availability, accessibility, or cost of immunization services, which are important considerations for low-income women, and which may have had some bearing on their ability to get their children immunized. Despite these shortcomings, the authors concluded that sustained nursing involvement with low-income African-American mothers, particularly multiparous teen mothers, was beneficial in dealing with child development and health related problems (Barnes-Boyd, 1995). Given that this study did not focus on immunizations, a rate of 80% is higher than might be expected without the ongoing involvement of nurses.

In a randomized controlled trial by Kitzman et al. (1997) the effect of prenatal and infancy home visitation in the Nurse-Family Partnership program in Memphis, Tennessee was examined. In this replication study, discussed earlier in relation to breastfeeding, women were randomized to one of four treatment conditions ranging from usual care to the full Nurse-Family Partnership program involving PHNs. Results showed that there were no program effects on children's immunization rates by 24 months of age. This study included only first time mothers, and did not compare immunization rates to the larger population rates making it difficult to know whether rates for study participants were the same as or lower than other families. Other studies have shown that the number of children in low-income families has a significant bearing on completion of basic childhood immunization (Falagas & Zarkadoulia, 2008; Feemster et al., 2009; Kim et al., 2007; Luman et al., 2003).

Two Australian randomized controlled trials involving midwives, but not PHNs, also found no differences in immunization rates for women involved in postnatal home visiting programs (Bartu, Sharp, Ludlow, & Doherty, 2006; Quinlivan et al., 2003). Although Bartu et al. (2006) considered both first time mothers and those with more children, neither of these studies discussed the comparable rates of immunization within the larger population of all families, except to note that there was no significant difference between them. This is a positive finding because immunization rates for higher risk groups are not expected to be as high as the general population. Quinlivan et al. (2003) noted that at the time of their study there was an ongoing national media campaign to improve immunization rates, which may have had an effect on the similarity of immunization rates between the two groups, but Bartu et al. did not report any media campaign influence in their study.

### **Immunizations, priority populations, and PHNs: A summary.**

From the various studies examining the involvement of PHNs with priority perinatal women, several factors emerged regarding findings related to infant immunizations among the priority population. These factors include the structured and limited role of nurses in some of the studies, the overall rates of immunization in the general population, the nature of the relationship established between nurse and mother, and the parity of the study populations involved. The randomized controlled trials reviewed here tend to reflect a specified and confined PHN practice, unlike the broader range of interventions that are a part of routine PHN practice, and which are described by the PHN intervention wheel model as contributing to population health (Olson-Keller, et al., 1998, 2004). In my experience in Canada, where immunizations are free, many PHNs are directly involved in administering vaccines, and so are very knowledgeable about risks and benefits, as well as the mechanics of clinics. This familiarity with the process allows PHNs to provide additional information and support for those families who need it, and may explain the lack of effect in studies where PHN roles were limited by research parameters.

A factor that was missing in many of these research projects was information regarding overall population rates of immunization compared to rates among those at higher risk. In this review, the randomized controlled trials involved intervention groups that were compared with control groups, reflective of similar priority perinatal women. In studies that showed no difference between the intervention and control groups, immunization rates were not compared with those of the larger population of all children, so it is difficult to say whether the desired rate of immunization was achieved. In three of the studies showing a positive effect on immunizations, the rates of immunizations noted as complete or up-to-date for age were 90% or higher. Although it is helpful to know whether there was a difference between intervention and

control groups, it is also important to know whether those rates were significantly lower than, or the same as, the general population because the ultimate goal is to achieve immunization rates that are high enough to provide herd immunity, thereby protecting the larger community.

The third factor that emerged through this review of the literature was the nature of the relationship between PHNs and priority perinatal women. When PHNs are involved with families on an ongoing basis, there are opportunities for friendly and trusting relationships to develop. Falagas and Zarkadoulia (2008) identified factors that influence parental decision-making about immunizations. These included the importance of healthcare providers who were friendly, communicative, provided accurate and detailed explanations, and showed a willingness to address parental hesitations and fears with patience and sympathy, all of which are an expected part of PHN practice.

Supporting that perspective are findings from a qualitative interview process, which explored the mentoring relationship between teen mothers and PHNs (Schaffer and Mbibi, 2014). In this study PHNs were viewed as contributing to the success of teen parents because PHNs were regarded as trustworthy, supportive, and encouraging, and helped to facilitate positive decision-making that promotes success (Schaffer & Mbibi, 2014). Although not specific to immunization rates, the inference is that trusting relationships between PHNs and mothers has the potential to influence parental decisions related to immunizations, as identified by Falagas and Zarkadoulia (2008). In this review, each of the studies showing a positive outcome related to immunizations identified the value of a trusting relationship between the PHN and the mother.

The fourth factor that came to light in this review was the parity of the study populations. Of the eight studies reviewed, four showed higher rates of immunizations among priority perinatal families. Of these studies, three involved multiparous as well as primiparous women (Armstrong

et al., 2000; Koniak-Griffin et al., 2002; Schaffer et al., 2012). In the four studies showing no effect on immunization rates, only two involved multiparous women (Barnes-Boyd, 1995; Bartu et al., 2006). It is particularly interesting to note that larger family size and single parenthood were identified as contributing to incomplete immunizations for preschool children (Falagas & Zarkadoulia, 2008; Feemster et al., 2009; Kim et al., 2007; Luman et al., 2003). It is also interesting to note that several of the intensive home visiting programs (Koniak-Griffin et al., 2002; Olds et al., 2004) focused their efforts on first time mothers under 19 years of age. If one of the contributing factors to incomplete immunizations is larger family size, then the findings of research projects involving only first time mothers may not be as generalizable as those involving women with more children.

Unlike programs that focus on women having their first child, PHNs in day-to-day practice are more likely to work with a wider range of perinatal women, often those with several children. However, we know little about the impact of the wider range of routine PHN practice on immunization rates in the priority perinatal population. Although each of these studies had different methodologies and interventions, viewed together the findings suggest the possibility that PHNs can have a positive effect on infant immunization rates among the priority population of perinatal women.

## **Summary**

The intent of this integrative literature review was to focus on a range of research approaches in studies involving public health nurses and their practice with perinatal women negatively affected by social and biological determinants of health. In particular, this review explored outcomes associated with breastfeeding initiation and duration, infant immunizations, and reduced maternal tobacco use. Each of these three outcomes has been shown to be important

to the health of individuals and populations. Perinatal women and their infants considered to be at higher risk for poor health outcomes are less likely to initiate breastfeeding, and when they do breastfeed, are likely to breastfeed for shorter periods (Ahluwalia et al., 2005; Eidelman & Schanler, 2012; Renfrew et al., 2012). This same population of women has been found to have higher rates of smoking (Adams et al., 2008; Erickson & Arbour, 2012; U.S. Department of Health and Human Services, 2014), and lower rates of infant immunizations (Kim et al., 2007; Luman et al., 2003; Public Health Agency of Canada, 2003). There is evidence that PHN involvement with these women and their families can make a positive difference in breastfeeding initiation and duration rates, tobacco reduction, and infant immunizations (Armstrong et al., 2000; Fetrick et al., 2003; Kemp et al., 2011; Mejdoubi et al., 2014; Koniak-Griffin et al., 2002; O'Connor et al. 1992; Olds et al., 1986; Pugh et al., 2002; Schaffer et al., 2012)

The search for literature in this review focused on each of the three key outcomes; however, in some instances links were identified between outcomes. For example, Hill and Aldag (1996) identified a relationship between smoking and breastfeeding status with smokers less likely than non-smokers to continue breastfeeding to eight weeks postpartum. Tough et al. (2006) found that additional PHN supports improved the use of community resources, such as breastfeeding help. Several studies were identified that focused on nurses in different roles than PHNs, although the interventions involved were similar to those normally provided by PHNs. For example, Chapman and Perez-Escamilla (2012) noted the effectiveness of multiple approaches in supporting breastfeeding, and Pentecost and Grassley (2014) identified the importance of consistent, accurate information along with practical support for the mechanics of breastfeeding. All of these findings are important components of day-to-day PHN practice, and ultimately may have an effect on the achievement of positive outcomes related to breastfeeding, tobacco use, and

infant immunizations.

Although the studies reviewed demonstrated positive outcomes in a number of areas, they were also limited in the generalizability of their results because of the strict nature of their research protocols. Some of the trials focused only on primiparous women, or on adolescents, or both, but few incorporated the wide range of perinatal clients that PHNs encounter in day-to-day practice. In addition, such protocols frequently restricted the range of other influences that affect routine PHN practice, for example, by providing nurses with smaller caseloads, more intense supervision, and additional education than they would normally experience in routine, day-to-day practice.

Several themes emerged throughout the review of this body of literature, which highlight the differences between structured research projects and every-day PHN practice. These themes included organizational influences, relationship development, and levels of PHN intervention. In day-to-day practice, PHN work is influenced by many organizational influences such as budgets, staffing levels, and competing priorities that affect the ability of PHNs to deliver service to priority perinatal women (Underwood et al., 2009). The nature of the population served by PHNs is also directed by the organization, and often includes a much wider range of priority perinatal women than those identified in many of the studies reviewed. This reinforces the value of studying routine PHN practice as it is delivered in a real life setting by recognizing the influences of the organization within which PHNs practice, the wider range of PHN interventions provided, and the broader priority perinatal population served.

The development of trusting relationships between PHNs and priority perinatal women is the second theme that was identified in many of the studies. Relationship development is an important component of PHN practice, as identified in Watson's (1999/2012) theory of human

caring science, and Falk-Rafael's (1996, 2005) mid-range theory of critical caring. The continuing involvement that PHNs have with priority perinatal women and their families over months, and sometimes years, provides an ongoing opportunity for the development of trusting relationships that can influence health outcomes. This is exemplified in Flaskerud and Winslow's (1998) vulnerable populations model, which suggests that PHN involvement can have a positive impact on the health status of low-income women by encouraging the use of health care services, thereby reducing relative health risks.

The importance of positive relationships was also noted by Kurtz Landy et al. (2012), who reinforced the value of a respectful non-judgmental approach, being engaged and interested, and even becoming friends. In a synthesis of qualitative studies, McNaughton (2000) showed that the central focus of PHN home visiting is to build a trusting relationship with the client, which provides a foundation for supporting mothers through empowerment and independent decision-making. By establishing and maintaining relationships over time, and by their ongoing presence in communities, PHNs are in an ideal position to address a range of individual and community level health concerns. This is another reason why it is important to study the impact of day-to-day PHN practice on the outcomes of interest.

The third theme that emerged from this review was the level of PHN intervention that was examined in these studies. In most of the studies, PHNs intervened at the individual level with a focus on perinatal care. The real-life practice of PHNs often includes a much broader practice that involves activities beyond individual level perinatal health, including such systems level activities, such as the establishment of WHO's Baby-Friendly (World Health Organization & Wellstart International, 2009) protocols to support breastfeeding in health care facilities, or advocacy for municipal smoking bylaws. It is the influence of this broader range of practice, as

outlined by Olson-Keller et al. (2004) in the PHN intervention wheel model, that was not addressed in many of the studies reviewed here, and which may contribute to positive outcomes through the multiple levels of day-to-day PHN practice.

Community and systems level PHN interventions are important because of the significance of community influences, such as those noted by Matone et al. (2012) in relation to smoking, or Renfrew et al. (2012) regarding breastfeeding. Many of the randomized controlled trials discussed earlier failed to recognize the impact of the broader community or systems level activities in which PHNs are involved. It has been my experience that a shift in culture evolves over time, such as with breastfeeding where women who successfully breastfeed go on to become informal supports for other women in their lives. Given the broad role of PHNs in Canada, community-level activities, such as school age tobacco prevention, or breastfeeding week promotions, are important activities that help to shift attitudes, but which are not often recognized as being contributing factors in achieving positive health outcomes. This reinforces the need for further research that examines the routine practice of PHNs as they work at community and systems levels in addition to the care they provide to individuals in an effort to promote health, particularly related to breastfeeding, tobacco reduction, and infant immunizations.

The broader public health literature has shown that PHNs are effective at home-based interventions and at community-level interventions (Deal, 1994; Fetrick, Christensen, & Mitchell, 2003; Koniak-Griffin et al., 2002; Olds, 2006; Olds et al., 1999; Olds et al., 2004; Olson-Keller, Strohschein, Lia-Hoagberg, & Schaffer, 2004). The focus on individuals as well as communities and systems means that PHNs engage in activities that support the broader population of women and families, building resources that may become ongoing supports in the

community and which can assist in changing local culture. In day-to-day practice, PHNs work to improve the health of individuals, families, and communities, including populations at greater risk of poor health. Their role in health promotion is clearly identified in the Canadian Community Health Nurses Standards of Practice (CCHN, 2011), and is linked to the Ottawa Charter for Health Promotion in an effort to enable people to have control over and to improve their health (World Health Organization, 1986). Examples of health promotion activities related to smoking, immunizations, and breastfeeding, among others, have been shown to be a cost-effective way to improve the health of populations (Jadelhack, 2012).

The literature reviewed in this chapter has demonstrated that PHNs can make a positive difference in initiation and duration of breastfeeding, infant immunization rates, and in maternal tobacco reduction and cessation for priority perinatal women. However, further research is needed to explore the effects on key outcomes of routine, day-to-day PHN practice at multiple levels of intervention, as it is affected by organizational influences. Further research is also needed to explore the use of administrative data from PHN client documentation to assess these outcomes. It was my intent to investigate these aspects further through a case study approach examining past PHN practice in one health organization. The theoretical foundations supporting PHN practice have been mentioned briefly in this literature review, however further explanation is needed, and follows in the next chapter.

## CHAPTER 3 - THEORETICAL FRAMEWORK

The aim of this chapter is to examine the theoretical foundations that relate to the nature of PHN work, and that form a framework for this case study. There are many nursing theories that guide public health nursing practice, and that operate at several ecological levels, from the broad metaparadigm (Schim et al., 2006) to more specific practice theories (Community Health Nurses of Canada, 2011; Betker, MacDonald, Hill, & Kirk, 2016). The focus of this chapter is on the critical caring theory (Falk-Rafael, 2005), a midrange nursing theory, which is particularly relevant to this inquiry. This theory helps to explain the nature of the relationships PHNs have with individuals, families, and communities, and how those relationships help to make a positive difference in health outcomes. However, to set the stage, I start by briefly discussing the public health nursing intervention wheel (Olson-Keller et al., 2004), which outlines the broad scope of PHN activities, and which explains the different levels and settings in which PHNs practice.

### **The Public Health Nursing Intervention Wheel Model**

The public health nursing intervention wheel model is a conceptual model that is population-based, practice-based, and supported by evidence (Olson-Keller et al., 2004). The intervention wheel model was originally developed in the United States in 1998 through a grounded theory process (Olson-Keller et al., 2004). Since that time there has been a rigorous critique of the model by hundreds of PHNs, which has validated the model and provided practice-based evidence supporting its foundation for PHN practice as well as the practice of other public health professionals (Olson-Keller et al., 2004). Even though the intervention wheel model was developed in the United States, its components also accurately reflect the practice of Canadian PHNs. The purpose of the model is to define public health nursing as a population-based

practice, and to describe the work of PHNs at the individual, community, and systems levels (Olson-Keller et al., 1998, 2004). Figure 2 depicts the intervention wheel model.

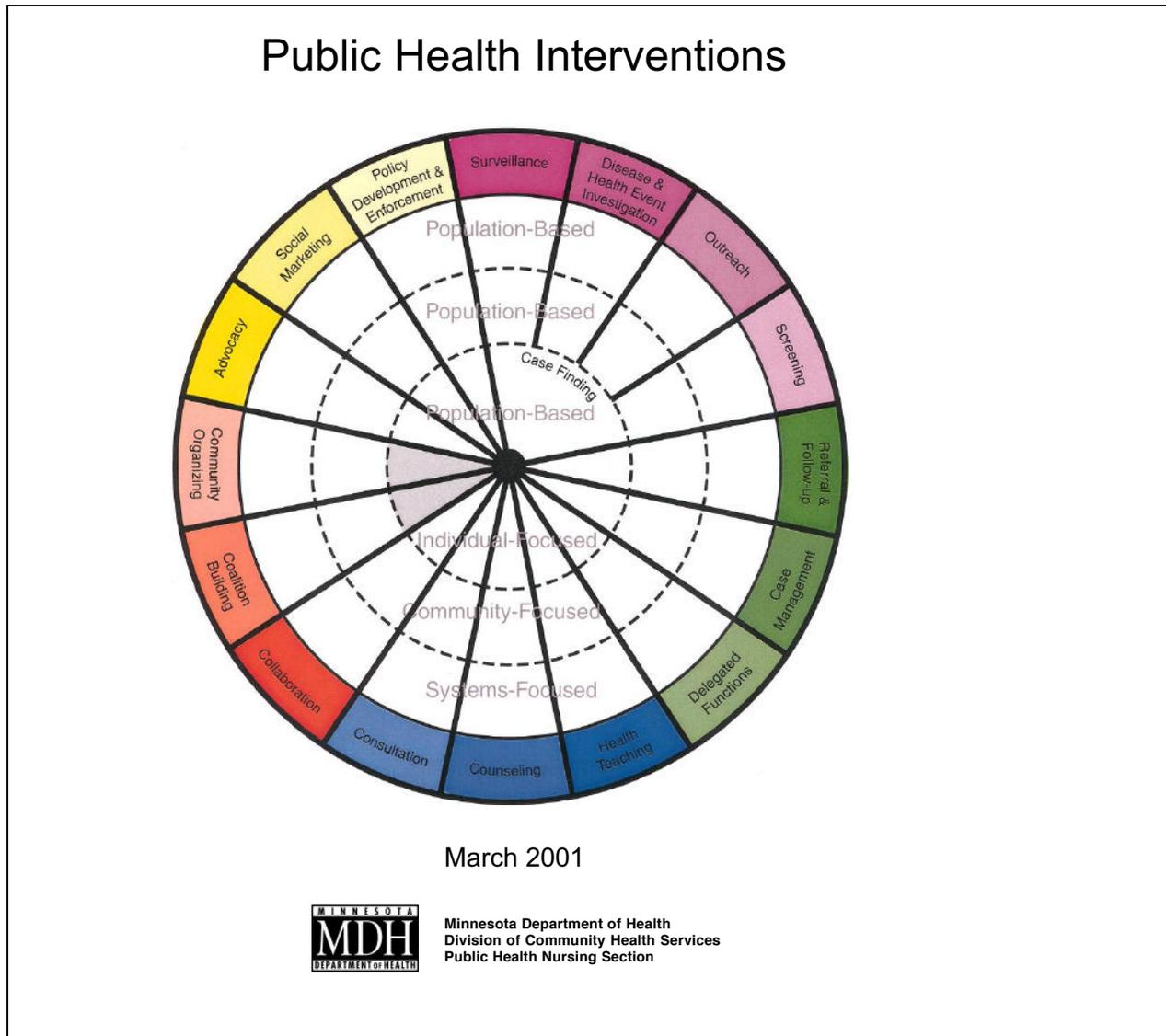


Figure 2. Intervention wheel model. Source: Public Health Interventions Applications for Public Health Nursing Practice, March 2001. Copyright © 2001 by Minnesota Department of Health. Used by permission of Minnesota Department of Health.

Population-based practice is focused on entire populations, considers the determinants of health, emphasizes prevention, utilizes community assessment, and identifies PHN interventions at three levels (Olson-Keller, et al., 2004). The model suggests how population health may be improved through interventions with communities, the individuals and families within those

communities, and the systems that affect the health of communities (Olson-Keller, et al., 1998, 2004). The PHN intervention wheel model is an important way to identify and communicate to decision makers and funders, the many aspects of PHN practice that often go unrecognized (Olson-Keller, et al., 1998). This model provides a useful framework for this study by describing the types of activities that PHNs in day-to-day practice might be involved with at the individual, community, and systems levels. It also provides a useful guide for the analysis of findings to show how activities at various levels can influence outcomes.

In this model, interventions at the individual level are person-to-person activities that affect change in knowledge, skills, or health status in individuals, families, groups, or communities, because they are members of a particular population (Olson-Keller et al., 1998). For example, one of the interventions identified as delegated medical treatment might include immunizations that are provided to individuals. However, when groups of people are immunized the health of the larger population is protected. This differs from population-based community-focused interventions, where interventions create changes in community attitudes, norms, and practices (Olson-Keller et al., 1998). An example of this might be social marketing where the ongoing promotion of breastfeeding helps to shift community norms towards greater public acceptance. Population-based systems-focused interventions are aimed at changes in laws, policies, organizations, or structures with a focus on the systems that serve individuals and communities (Olson-Keller et al., 1998). An illustration of this would be policy development in collaboration with a school board to establish smoking bylaws for schools.

Among the interventions identified in the model are several that relate specifically to the work of PHNs with priority perinatal women at each of the levels of practice. These include screening for health risk factors; case finding to locate individuals and families with identified

risk factors, assisting individuals and families with appropriate referrals and follow-up for additional resources to prevent or resolve problems, case management to optimize the capabilities of individuals, health teaching to communicate information and skills, counseling through the development of interpersonal relationships with individuals or groups, consultation to address problems or issues, and advocacy with a focus on developing capacity in individuals or groups (Olson-Keller et al., 1998). Each of these interventions can be carried out at the different levels of practice, and all of these activities are a routine part of the work of PHNs in Canada (Community Health Nurses of Canada, 2011).

The combinations of different interventions at different levels, for different populations all contribute to the achievement of various health outcomes. For example, providing one-to-one support for mothers enables them to continue breastfeeding for a longer period, and by promoting and celebrating breastfeeding as a normal and healthy approach to infant feeding, community attitudes become more accepting. Adding to that, PHN collaboration with community partners leads to policy changes at the systems level, and supports women to continue breastfeeding once they have returned to work. While some of the interventions may be targeted at the priority population of perinatal women, other interventions are aimed at the whole population of all new mothers, or even the entire community. Although not all PHNs routinely do all of these interventions at all levels, these interventions reflect the range of day-to-day activities of PHNs.

In summary, the public health nursing intervention wheel model presents a comprehensive outline of the nature of PHN work at all three levels. It clearly demonstrates the link between individual service, such as one-to-one involvement with priority perinatal women, and the broader health of the population. Olson-Keller et al. (2004) note that services to individuals and

families are population-based when those individuals are members of an identified population, and those services will help to improve the overall health of that population. The public health nursing intervention wheel model provides a structure to describe the many activities that PHNs do at the individual, community, and systems levels to help improve the health of individuals, families, groups, and populations. As such, it provides a background framework with which to better understand the critical caring theory that was used to guide this research.

### **Critical Caring Theory**

Critical caring is a mid-range hybrid theory for public health nursing developed in Canada by Falk-Rafael (2005) and elaborated by Falk-Rafael and Betker (2012a, 2012b). Critical caring was used as a theoretical framework to guide this case study by describing the essence of PHN practice, and providing a way to structure the analysis of data gathered from PHNs. The themes identified from interviews were linked with the seven carative health-promoting processes that have been identified as the core elements of PHN practice (Falk-Rafael, 2005; Falk-Rafael & Betker, 2012a).

Critical caring is considered an ecological theory in that it acknowledges various levels of interventions, from the individual level to communities and systems, in order to achieve changes in health behaviour (MacDonald, Newburg-Cook, Allen, & Reutter, 2013; Sallis, Owen, & Fisher, 2008). An ecological approach is useful to examine the broad array of factors influencing the health of populations (MacDonald et al., 2013). Falk-Rafael and Betker (2012a) explain that a major component of the critical caring theory is the establishment and maintenance of relationships, which is essential to the effectiveness of PHNs in their work with individuals, families, communities, and groups to improve health outcomes.

By linking Watson's human caring science (Watson, 1999/2012) with critical feminist theories, Falk-Rafael (1996, 2000b, 2005) proposed empowered caring as a way of being and knowing. Building on Watson's ten caritas processes, which represent the core of nursing, Falk-Rafael (2000b, 2005) describes seven carative health-promoting processes that reflect the focus of public health nursing. In this way caring continues to be a relational way of being with active participation and sharing of power between the nurse and the client, both at the individual level and beyond. Figure 3 shows a model of the critical caring theory.

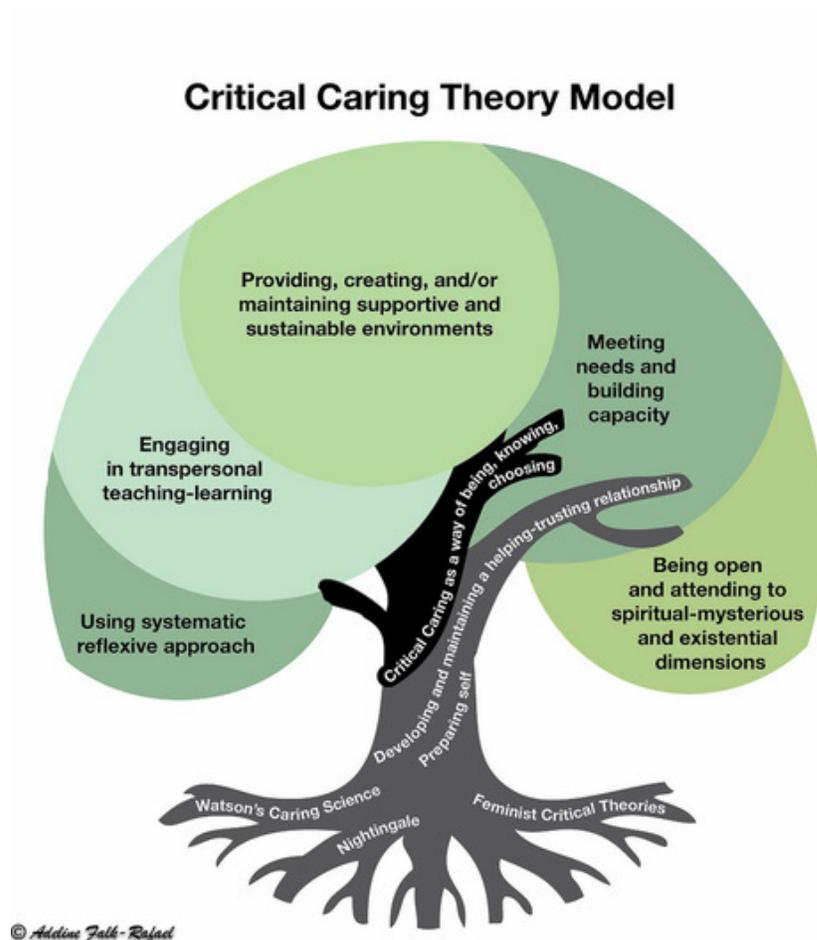


Figure 3. Critical Caring Theory Model by Falk-Rafael and Betker (2012a). Source: Advances in Nursing Science Blog, January 2013. <https://ansjournalblog.com/2013/01/09/critical-caring-model-update/> Used with permission of Adeline Falk-Rafael.

The first of the curative health-promoting processes is the preparation of the nurse who brings clinical expertise into the relationship to share with, rather than impose on the client (Falk-Rafael, 2005). This expertise involves multiple ways of knowing (Carper, 1978), and reflects both the formal education that PHNs bring to their role, as well as their past experience as a nurse and as a PHN, along with their knowledge of the community, the local culture, and the sociopolitical world in which they work (Falk-Rafael, 2005). In working with priority perinatal women, PHNs have a wide range of resources to draw on to support individuals and families by building on experience, and through consultation with team members.

Developing and maintaining a helping-trusting relationship is the second curative process (Falk-Rafael, 2005). Such a relationship may be at the community level, as well as at the individual level, and involves listening and responding to self-identified needs (Falk-Rafael, 2005). Sometimes, such as when there are urgent health issues, a relationship may not begin with those self-identified needs, however the nurse's involvement becomes a starting point for further engagement. A trusting relationship between mothers and PHNs is related to positive maternal-child outcomes (Kitzman et al. 1997; Weiss, 1993). However, relationships take time to build, and involve an ongoing commitment before trust is built. Mothers at increased social and economic risk due to young age, low income, or lack of education are often difficult to engage because of their prior negative experience with health care providers or with the system of care. Thus, they may feel vulnerable and powerless when service providers like PHNs are allowed into their homes (Jack, DiCenso, & Lohfeld, 2005). Jack et al. (2005) found that the personal characteristics, actions, values, and experiences of both PHNs and mothers influence the speed at which relationships develop. They also found that as trust increased, mothers were more able to open up and discuss personal issues in an honest way, particularly when they knew

that the PHN was reliable, would not react in a negative way, and respected confidentiality. One of the outcomes related to the establishment of trust is an increased motivation on the part of the mother to consider and improve parenting skills and knowledge (Jack et al., 2005).

The third of Falk-Rafael's (2005) carative health-promoting processes is the use of a reflexive, systematic approach to caring in the context of health promotion. At the individual level, as well as at the community level, this involves multiple ways of knowing and a creative use of self in the process of caring (Falk-Rafael, 2005). Falk-Rafael and Betker (2012a) describe reflexivity as being open and responsive to the needs, goals, and potential of individuals, and note how such reflexivity in trusting relationships highlights the ability to mutually identify health concerns. In working with priority perinatal women, PHNs take into consideration the individual needs of families, with the result that mutual decision-making is based on perceived barriers and personal priorities (Falk-Rafael, 2005). PHNs also bring to the process their knowledge of the community, its resources and services, which may be of benefit to the client (Falk-Rafael & Betker, 2012b).

Transpersonal teaching-learning is the fourth of Falk-Rafael's (2005) carative health-promoting processes. This is an approach to supporting individual learning within a nurturing relationship that builds on the client's reality and their related knowledge, and leads to empowerment through active participation (Falk-Rafael, 2005; Falk-Rafael & Betker, 2012a). The PHN, working together with a particular mother, is better able to tailor the teaching and learning strategies to the needs and priorities of that individual, and help her to understand more about such choices as infant feeding or immunizations. Exploring a woman's understanding of breastfeeding, for example, provides an opportunity to discuss what that choice might mean for herself and her baby, as well as the kinds of supports that are available to her. Provision of one-

to-one breastfeeding support in a trusting relationship with a PHN after the arrival of the baby helps to address some of the personal issues that may be critical for women, enabling them to continue breastfeeding rather than giving up in frustration. This development of personal skills is one of the health promotion strategies identified by the Ottawa Charter (World Health Organization, 1986), and which is frequently achieved through health education. The acquisition of such personal skills also enables women to lend support to family and friends with similar issues.

The fifth carative process of contributing to the creation of supportive and sustainable physical, social, political, and economic environments reinforces health as an issue of social justice (Falk-Rafael, 2005). Although much of this involves population-level work, as described earlier in the PHN intervention wheel model, it also includes nursing activities at the individual level that ultimately contribute to the health of the broader population (Falk-Rafael, 2005). An example is the support a mother needs in order to consider immunizing her child, if that is something about which she has little understanding. By choosing to immunize her child, a contribution is made toward the health of the local population. Similarly, understanding the environmental, economic, and social factors that affect the life of a single young mother help the PHN in working together with her to address a range of health issues. By recognizing a lack of financial resources and transportation, a PHN might help a young mother to plan for ways to attend scheduled well-baby clinics. At the systems level PHNs might work towards establishing no-appointment immunization clinics, or creating a budget for transportation to cover the costs of taxi vouchers or bus tokens to facilitate clinic access by families in need. PHNs might even work with the bus system to modify routes, improving access to health care services (Betker, MacDonald, Hill, & Kirk, 2016).

Building capacity and meeting the needs of communities and their members is the sixth carative process identified by Falk-Rafael (2005). This includes meeting the needs of the vulnerable members of that community, and supporting their growth and development. This might involve working directly with individuals and families, linking them to community supports and services, working in partnership with other health and support disciplines such as physicians and social workers, or even locating food and clothing to share with those in need (Falk-Rafael, 2005; Falk-Rafael & Betker, 2012a). Such activities often lead PHNs to engage in community development activities when common issues become apparent in a community, encouraging and supporting individuals to become involved in addressing problems thereby helping to build capacity at both the individual and the community levels (Falk-Rafael & Betker, 2012a). PHNs identified such capacity building opportunities as helping to improve client empowerment and self-worth (Falk-Rafael & Betker, 2012a).

The last of the carative health-promoting process involves being open and attending to spiritual-mysterious and existential dimensions. This involves honoring the local belief systems, respecting the local culture, and working within those systems to find appropriate solutions to problems (Falk-Rafael, 2005; Falk-Rafael & Betker, 2012a). It might also involve working with individuals and communities to help them come to terms with devastating events or disasters in ways that respect their spirituality (Falk-Rafael & Betker, 2012a).

### **Why is the critical caring theory important to this inquiry?**

The seven carative health-promoting processes root public health nursing practice in nursing caring science as well as concepts of social justice (Falk-Rafael, 2005). The theory of critical caring proposes that through these seven carative processes it “is a way of being (ontology), knowing (epistemology), choosing (ethics), and doing (praxis)” (Falk-Rafael & Betker, 2012a, p.

317). A study by Falk-Rafael and Betker (2012a; 2012b) supported the relevance of this theory to the practice of PHNs in Canada by examining the fit and relevance between the practice of expert PHNs in Ontario and the theory. Falk-Rafael also pointed out that because caring is inextricably linked to the concept of a relationship, organizational approaches to population health that rely solely on epidemiological evidence, or where administrative directives that limit PHN practice to such things as communicable disease prevention and outbreak control, are “antithetical to caring science” (Falk-Rafael, 2005, p.47). She warns that a medically dominated and politically driven bureaucracy may negatively influence PHN practice (Falk-Rafael, 2005).

The use of critical caring theory in the research literature is limited at this time. Shearer (2016) described the use of critical caring in the synthesis of a new theory of critical caring protection for empowering PHNs, seasonal farmworkers, and migrants in the context of environmental protection. Although there are references to critical caring in the general literature, Shearer’s (2016) example was the only one found that used the theory in a research context. This present case study may be an opportunity to fill that gap in research.

The theory of critical caring forms a significant foundation for this inquiry into the effectiveness of PHN involvement with priority perinatal women, and the organizational influences that affect the ability of PHNs to support priority perinatal women. The seven carative health-promoting processes provide a framework for the analysis of the various examples of health authority factors that PHNs described as having an effect on their work. In a complex world of constantly evolving events, the role that PHNs have in caring for individuals and communities, and in developing trusting-helping relationships makes a difference in some of the key health outcomes for which they strive.

## **Summary**

The theoretical foundations for this research project build on the PHN intervention wheel model, which explains the nature of PHN population-based practice, and demonstrates how specific interventions may occur at the individual level, the community level, or the systems level (Olson-Keller, et al., 1998, 2004). The primary theory informing this inquiry is the critical caring theory developed by Falk-Rafael (2005), which provides important concepts central to the work that PHNs do to improve population health outcomes, and to the organizational factors that influence their work. The theory of critical caring not only helped to shape the process of data collection and analysis in this inquiry, but it is also congruent with the broader philosophical and theoretical perspectives of critical realism, which is further discussed in the next chapter.

## **Chapter 4 – Philosophical foundations**

Before discussing the methodology of this research project, it is important to consider the philosophical foundation upon which this research design is situated. The justification for the use of a particular methodology reflects assumptions about reality and about knowledge (Crotty, 2010). This chapter begins with an examination of the realist ontology and the relativist epistemology of critical realism as the philosophical perspective I have chosen to use in this mixed methods case study inquiry. This is followed by a discussion about how critical realism relates to the methodology and analysis of a case study.

### **Introduction to Critical Realism**

Critical realism originated with philosopher Roy Bhaskar who, in the early part of his career, and working with Rom Harre, extended the notion of philosophical realism to include the social dimensions of humans and science (Clark et al., 2008). Bhaskar (2008) indicated that real structures in the world and unseen mechanisms exist and act independently of our experience of them, and under certain conditions events are generated, which we are then able to observe and experience. In this view, physical and social entities are seen as having an existence that is independent of human knowledge or understanding, and reality is viewed as having powers and mechanisms that are not visible, but which can be experienced indirectly by their ability to make things happen (Clark et al., 2008; Danermark, Ekstrom, Jakobsen, & Karlsson, 2002).

Critical realism emerged as a way to incorporate the strengths of, and manage the weaknesses of relativism, idealism, and positivism by acknowledging not only the reality of science, but also the social aspects of humans (Clark et al., 2008). By taking a middle ground among these perspectives, critical realism does not view the world as unknowable chaos, nor does it see the universal order of positivism, but it highlights the importance and influence of

human perspectives (Clark et al., 2008). Critical realism is seen as being part of the post-positive paradigm (Lincoln, Lynham, & Guba et al., 2011), in which the findings of research are neither entirely objective nor undeniably certain (Crotty, 2010). The goal of critical realism is to look for the causes of phenomena in a continuously changing social structure, and to search for deeper levels of comprehension and explanation (Appleton & King, 2002; McEvoy & Richards, 2006; Wainwright, 1997). In the multifaceted world of healthcare and nursing, critical realism is increasingly being seen as a way to understand the complex phenomena involved in evidence-based and person-centered care (Parlour & McCormack, 2012; Schiller, 2016).

The term ‘critical realism’ comes from the merging of a transcendental realist philosophy of science with a critical naturalist philosophy of social science (Bhaskar, 1998c). In transcendental realism, social activities are considered to be both historically transient and reliant on the powers of human beings as causal agents rather than simply as thinkers or observers (Bhaskar & Lawson, 1998). Within this perspective Bhaskar describes the “objects of knowledge as the structures and mechanisms that generate phenomena” (1998b, p. 19), and that they are “real structures which endure and operate independently of our knowledge, our experience and the conditions which allow us access to them” (1998b, p. 19). In this view, both knowledge and the world are seen as structured, differentiated, changing, and existing independently of each other (Bhaskar, 1998b). A naturalist tradition views sciences as being linked with positivist principles, while an anti-naturalist position sees a difference between the natural and social sciences when it comes to method because the aim of social sciences is to elucidate meaning (Bhaskar, 1978, 1998a). A critical naturalist position is described by Bhaskar (1998a) as falling between the positivist and hermeneutical views, and as being “a qualified, *critical* and non-reductionist, *naturalism*, based upon a transcendental realist account of science and, as such, necessarily

respecting (indeed grounded in) the specificity and emergent properties of the social realm” (p. xiv). Bhaskar summarizes critical naturalism by saying that “the social sciences can be ‘sciences’ in exactly the same sense as natural ones, but in ways that are as different (and specific) as their objects” (1998a, p. xvii). Bhaskar (1998c) recognized the challenge of maintaining a clear understanding of the independent reality of being at the same time as recognizing the relativity of knowledge, and he submitted that critical realism combines a realist ontology with epistemological relativism.

### **Ontology of Critical Realism**

Bhaskar (1998b) identified an ontology that is stratified into three domains of reality, which comprise the real, the actual and the empirical. The empirical domain involves those aspects of reality that we perceive, experience, or observe, either directly or indirectly, such as data collected through research (Clark et al., 2008; Danermark et al., 2002; McEvoy & Richards, 2006). According to Bhaskar (1998b, 2008) the domain of the empirical is limited to experiences. This includes what we experience, as well as our fallible human perceptions (Carlsson, 2005). These transitive theories, perceptions, and speculations are considered fallible because such knowledge is a human construct, and may change over time as new knowledge is developed (Schiller, 2016). Bhaskar (1998 b) explained that experiences are social products, and that the conjunction of events, perceived through experience, and which provide empirical grounds for causal laws, are also social products. We perceive information in the empirical domain through direct and indirect experiences linked with the actual domain (Clark et al., 2008; Schiller, 2016). The empirical domain is separate from the actual domain, and is considered a subset of this second ontological level (Danermark et al., 2002).

The actual domain is where events happen even though they may not be observed or experienced (Danermark et al., 2002). Bhaskar (2008) explained that the actual domain includes all phenomena and events that occur in the world even though we, as humans, may not be aware of them. An example of this would be a tree falling in the woods when no one was there to see it, however this does not mean that the tree did not fall anyway (Schiller, 2016). The key difference between the actual and the empirical level is that while the empirical level considers only our experiences, the actual level includes both experiences and events (Bhaskar, 2008). While the empirical domain is a subset of the actual, the actual domain is further a subset of the third ontological level, the real domain (Bhaskar, 2008).

The real domain includes experiences, events, and mechanisms (Bhaskar, 1998b, 2008). These are interpreted as the underlying structures, mechanisms, relations, and powers which can be explained but not always observed (Wainwright, 1997). Bhaskar (1998b) suggests that it is these structures, mechanisms, powers, and tendencies that generate or facilitate the phenomena that we may or may not experience. These unseen mechanisms are termed the “intransitive objects of scientific theory” (Bhaskar, 2008, p.37). Such intransitive objects then combine to produce phenomena that comprise the actual domain (Bhaskar, 2008). In the real domain, such causal mechanisms exist and act independently of human awareness and cannot be observed directly, but can be inferred through a combination of theory development and investigation (McEvoy & Richards, 2006; Schiller, 2016). Bhaskar (1998b) notes that mechanisms and structures are real and distinct from the patterns of events that they produce, and that events are real and distinct from the experiences in which they are understood.

Thus, underlying the ontology of critical realism is an implicit sociology where facts may be seen as being produced by nature or people (Bhaskar, 1998a). It is this that ultimately leads to

the realm of social sciences and social inquiry through a resolution of the differences between “a hyper-naturalistic positivism and an anti-naturalistic hermeneutics” (Bhaskar, 1998a, p. xiii).

Bhaskar (2008) sees the objective of science as producing knowledge about the mechanisms and structures that combine to produce certain phenomena, or the outcomes of interest in research (Schiller 2016). This view of a stratified ontology is what sets critical realism apart from other philosophical approaches, where the focus is on only the empirical or actual domains where events can be observed or measured (Schiller, 2016). In critical realism, it is the search for the underlying mechanisms and causes of events at the real domain that is the true focus.

### **Epistemology of Critical Realism**

Epistemology is concerned with the theory of knowledge, how it is perceived and acquired, and the scope and limits of human knowledge (Mautner, 2000). Bhaskar (1998c) identifies critical realism as having a relativist epistemology because the approaches used by people to learn about an event are contextual, may be historically transient, and may change over time. A relativist epistemological position holds that knowledge needs to be evaluated relative to the particular context in which it is produced, or relative to the perspective of those making the claim (Rodgers, 2005). Critical realists see knowledge as a social and historical product, with a view that truth is based in socially created and validated beliefs (Isaac, 1990).

Critical realists see reality has having an objective existence, but recognize that our comprehension of it is conceptually mediated with facts being dependent on theory but not determined by theory (Danermark et al., 2002). This means that such knowledge of facts is fallible and imperfect, and open to modification (Danermark et al., 2002). This also recognizes that people change as a result of new experiences and new knowledge, which leads to continual change in the social phenomena under study (Danermark et al., 2002). In evaluating knowledge

relative to the particular context, critical realism provides a framework that supports inquiry into the complex nature of the real world, and recognizes both the reality of science and the social aspects of human nature.

The middle ground between the positivist's search for scientific principles and the desire for the understanding and enlightenment of hermeneutics (Rodgers, 2005) indicates that critical realism is an appropriate philosophical perspective to support my exploration of the organizational context within the complex environment of a healthcare system where political, personal, and systemic influences can have an impact on the effectiveness of PHNs in achieving certain health outcomes for perinatal women. Making program and service decisions based solely on numerical data compiled from health records could lead to erroneous assumptions unless there is recognition of the social, organizational, and political context of PHNs and their work environment. A critical realist perspective acknowledges the value of multiple sources of data related to the same phenomena, and of the need to reconcile different perspectives (Clark et al., 2008). Thus, critical realism is an appropriate philosophical foundation with which to consider both the quantitative and qualitative data that was obtained from administrative data and from PHNs and PHN leaders in the very real and complex world of health care.

### **Methodological Implications**

Critical realists suggest that the nature of the research problem should guide the choice of methods (McEvoy & Richards, 2006). Danermark et al. (2002) emphasize that, from a critical realist perspective, the role of theory is important in guiding research, but that it should not be subordinate to methodological rules. Given the ontological and epistemological assumptions of critical realism, the search for underlying causal mechanisms can involve a range of methodological approaches including both quantitative and qualitative methods (Danermark et

al., 2002). The value of quantitative methods is that they may be able to provide dependable descriptions, recognize patterns, and identify associations, which may help to illuminate causal mechanisms (McEvoy & Richards, 2006). From a critical realist view, qualitative methods are also valuable in that they allow themes to emerge that might not have been expected, and they can help to clarify complex relationships and concepts that might not be identified by purely quantitative approaches (McEvoy & Richards, 2006). Because of this wider view, critical realism offers a philosophical view that is compatible with both quantitative and qualitative methods in research (Maxwell & Mittapalli, 2010).

Case study has been identified as one of many methodological approaches that are appropriate to use with a philosophical foundation of critical realism, as it is well suited to look for deeper explanations and knowledge about underlying mechanisms (Danermark et al., 2002). Critical realism tries to understand and produce in-depth explanations of the causal mechanisms, how they exert effect, and under what circumstances they have been triggered and activated (Bergin, Wells, & Owen, 2008). By using the quantitative data from the integrated public health information system to look for patterns, and combining that with insights from interviews and documents, I looked for causal mechanisms that might be at play in affecting the outcomes of interest with priority perinatal women in one particular health region. By looking beyond the directly observable experiences at the empirical level, to explore events that may or may not be initiated at the actual level, I sought mechanisms at the real domain that affected the outcomes of interest.

### **Analytic Implications**

A critical realist analysis is built around determining the properties that establish the nature of the object of enquiry, separating the necessary properties from the contingent ones, and

attempting to show what it is about an object that makes it unique (Danermark et al., 2002). In uncovering the structure of such objects Sayer (1992) suggests asking such questions as “What is it *about* the object that makes it do such and such?” or “What does the existence of this object (in this form) presuppose?” (p.91). To understand the dynamic dimension of reality, this analysis also needs to be supplemented by an investigation of the causal conditions (Danermark et al., 2002). An analysis of causal conditions seeks to understand why what happens does actually happen (Danermark et al., 2002). This is important because understanding the causes of events or outcomes allows us to intervene to adjust future courses of action (Danermark et al., 2002).

In this research project I looked for structures and casual mechanisms underlying and influencing the object of study, which were the outcomes associated with priority perinatal women who received additional and ongoing contacts with PHNs. Use of the critical caring theory (Falk-Rafael, 2005) provided a framework with which to start coding and organizing the data from PHN interviews and guiding documents. The analysis then involved looking for the structures and generative mechanisms related to the healthcare organization as described by PHNs, and which ultimately had a bearing on the outcomes of interest in either a positive or negative way. A critical realist approach to looking for those structures and mechanisms is through the process of retrodution.

Critical realism utilizes a logic called retrodution (McEvoy & Richards, 2006). As a critical realist concept, retrodution is a mode of inference or analysis where events are studied with a view to determine what may have caused them, and to explain why events happened the way they did (Danermark et al., 2002; McEvoy & Richards, 2006). Different from deduction or induction, retrodution is a thought operation that allows us to move from knowledge of one thing to knowledge of another by going beyond the empirically observable to gain knowledge

about the internal relations between phenomena at different levels of reality (Danermark et al., 2002). The primary goal in the critical realist approach is to search for explanations based on the retroductive inferences produced, which involves identifying causal mechanisms, determining how they work, and under what conditions they have been activated or not (Sayer, 2000).

Bhaskar (2008) suggests that the generative mechanisms identified should be viewed as tendencies rather than causal laws because of the wide range of possible interactions among structures. In critical realism there is recognition that social structures do not operate in a closed system where the same effects are produced consistently each time, rather in an open system where there is interaction with other structures, and which helps to explain why different people act in different ways in different places (Bhaskar, 2008; Cruickshank, 2012). This understanding not only reflects the nature of healthcare organizations in general, but may also help to explain differences in the findings of this case study.

In the analysis of this study I looked for generative mechanisms that influenced outcomes related to breastfeeding, tobacco use, and immunizations, while at the same time recognizing that all of these choices are made by different women, visited by different PHNs, under a variety of different circumstances. By using a variety of data sources I used triangulation to enhance the reliability and validity of my findings, as well as providing a wider range of perspectives (McEvoy & Richards, 2006).

## **Summary**

Critical realism remains central to problem-focused approaches that emphasize complexity in attempting to understand important health issues (Angus, 2012). Critical realism considers that events are the result of many factors that merge under certain circumstances or contexts to generate new events (Clark et al., 2008). This is a familiar experience in nursing where many

factors come together to generate a particular outcome, often in a consistent pattern, but not always in a predictable manner (Clark et al., 2008). Gerrits and Verweij (2013) suggest that Bhaskar's view of the world as complex is not just a basic tenet of critical realism, but it provides a meta-framework for seeing reality as complex and systemic. From a critical realist perspective, the goal of research is not the identification of generalizable laws, as in a positivist perspective, nor to identify the lived experiences of individuals in an interpretivist view, but rather to develop deeper levels of explanation and understanding (McEvoy & Richards, 2006).

A philosophical foundation of critical realism provides a solid basis upon which to create a case study design using mixed data collection methods. Critical realism accommodates both qualitative and quantitative methods of inquiry, which are important aspects of examining the real-life world of PHN involvement with priority perinatal women. This foundational structure supports the use of a case study methodology to explore the influences on PHNs as they work with priority perinatal women to achieve healthy outcomes. Critical realism has relevance for this inquiry because of the complex nature of health care, and in particular public health nursing services that provide a range of different services within a limited budget, delivered by PHNs with a variety of backgrounds and supervised by a variety of managers with different interests and foci, to a group of women who may not all share the same health goals that PHNs are trying to promote.

## **Chapter 5 – Methodology**

In this chapter I address the methodological aspects of my research in four main sections. In the first part I discuss the use of case study as a design, its philosophical foundations, its strengths and limitations, and why it was useful in answering my research questions. In the second section I explain the use of mixed data collection methods within the case study design, and how both quantitative and qualitative data from various sources inform my findings. The third part focuses on the details of data collection methods, including the types of data and the procedures related to collection, the sources of data and why these sources are important, and the kind and amount of data collected. The last part of this chapter looks at the analysis of both quantitative and qualitative data. This includes how data were organized, brought together, and interpreted. I discuss the analytical processes used to make sense of the data, relevant statistical tests, and possible relationships between different categories of data. The goal of this analysis is to ensure the evidence actually answers the following primary research questions:

- How does additional and ongoing PHN contact with priority perinatal women relate to breastfeeding, infant immunizations, and household tobacco use compared to the general population of new mothers receiving usual services?
- How do organizational factors affect the work PHNs do to support priority perinatal women in achieving these outcomes?

Before addressing these questions, however, it is important to set the stage for this enquiry by exploring the use of case study as an approach to research.

### **Part I – Case Study as a Research Design**

The development of case study as an approach to research has been influenced by a variety of schools of thought during the course of the 19<sup>th</sup> and 20<sup>th</sup> centuries (Bergen & While, 2000).

From pure science to anthropology and sociology, different disciplines have shaped the meaning of case study (Bergen & While, 2000). The Chicago School of Sociology saw case study as a collection of relatively unstructured but detailed information about a particular situation (Hammersley as cited in Bergen and While, 2000). This view of relatively unstructured information has not always fit well with the traditionally disciplined and structured approaches to research.

### **What is a case study?**

Over time, as the use of case study has become more common, the description of case study as a methodology has evolved to become known as an intensive detailed study of a particular bounded phenomenon in the context of time, place, and real life (Luck, Jackson and Usher, 2006; Merriam, 1988; Stake, 1995; Yin, 2009). Some of the characteristics of case studies include the boundaries of a case; the intensiveness of investigation including richness, detail, variance, depth, and completeness; time and place; and environment, which provides context to the case (Flyvbjerg, 2011).

Case study has been defined as an empirical inquiry investigating in depth a specific phenomenon within its real-life context, and relying on multiple sources of evidence (Yin, 2009). A case study does not depend on any particular methods for data collection or analysis, and instead uses any and all methods to gather data (Merriam, 1988). Some case studies are designed to achieve insight, discovery, or interpretation, while others are designed to test hypotheses (Merriam, 1988). This means that the case study approach can use both quantitative and qualitative data even though they come from different philosophical backgrounds.

### **Philosophical foundations of case study.**

Discussions about the philosophical foundations of case study are normally embedded within the literature related to qualitative inquiry (Merriam, 1988), although I am interested in the quantitative perspective as well. There have been three notable writers with expertise in case study. Yin (2009), Stake (1995), and Merriam (1988) all write about the detail of case studies with many overlapping similarities, and some differences. Yin and Stake both have backgrounds in psychology, while Merriam's experience is in education (Merriam, 1988; Stake, 1995; Yin, 2009). Stake and Merriam take a more qualitative approach, while Yin incorporates a more quantitative perspective (Merriam, 1988; Stake, 1995; Yin, 2009). Some see case study as a design grounded in an interpretive, constructivist paradigm (Anthony & Jack, 2009; Baxter & Jack, 2008), although each of the main writers have their own slant. Yin (2009) takes a more post-positivist perspective seeking to establish causal propositions to be proven, while at the same time using both quantitative and qualitative data. This post-positivist view aligns well with a critical realist outlook. Stake takes an interpretive approach to case study, although he agrees that quantitative research can be undertaken through case study (2006). Merriam (1988), on the other hand, takes a pragmatic view, noting that case study, as a basic design, accommodates a variety of philosophical perspectives on the nature of research, and may include both quantitative and qualitative data. Others agree suggesting that case study is transparadigmatic, in that it is relevant regardless of one's research paradigm (VanWynsberghe & Khan, 2007).

Based on a philosophical perspective of critical realism, a case study approach was chosen to facilitate a more informed understanding of the day-to-day context of PHN practice, and the underlying generative mechanisms within the organization that may affect the ability of PHNs to support priority perinatal women in achieving the three outcomes of interest. From a critical

realist's view, one of the goals of research is to identify the casual or generative mechanisms at play; those various actual causes of events at deeper levels that may not be directly observable (O'Mahoney & Vincent, 2014). Case studies offer a way to examine both the generative mechanisms identified, and the context surrounding those mechanisms (Ackroyd & Karlsson, 2014). Case studies provide an opportunity to consider the many and often conflicting perspectives of those involved in a situation, and to seek a better understanding of the contextual conditions that give rise to underlying mechanisms that influence the observed outcomes (Vincent & Wapshott, 2014).

Despite varying philosophical foundations, case study as an approach to inquiry allows for an in-depth exploration of phenomena as they occur in their natural environment. The aspect of natural, real life settings is of particular interest to me in exploring the active world of public health nursing. Nursing philosophy has moved away from the application of purely scientific principles and absolute objectivity, and recognizes people's multiple truths and unique realities (Rodgers, 2005).

### **Type of case study.**

A variety of case study designs have been established based either on the size of the case or on the intent of the analysis (Creswell, 2013; Yin, 2009). Yin (2009) describes four types of case studies based on whether the design includes a single case or multiple cases, and if it is a holistic design with a single unit of analysis, or an embedded design with multiple units of analysis within the context of one case. An instrumental case study is used when there is a need for a general understanding about a broader issue or concern, and uses one bounded case to illustrate it (Creswell, 2013; Stake, 1995), while explanatory research generally seeks a causal relationship

(Yin, 2009). The intent of descriptive research is to examine events or situations and to illustrate the complexities within them (Merriam, 1988).

In this research project I have chosen a single, embedded case study design incorporating mixed data collection and analysis methods. This study is instrumental and explanatory in order to gain a better understanding of the organizational influences that affect the three outcomes of interest. Merriam (1988) notes that description and explanation are often used when it is not possible to manipulate potential causes, or when variables are too embedded in a context to be extracted. From a critical realist perspective, the desire to examine context and to search for underlying causal mechanisms fits with a descriptive and explanatory approach.

The rationale for a single-case design is to look at a case that is representative or typical with the intent of capturing the circumstances of ordinary, everyday situations (Yin, 2009). This enables a better understanding of the differences between settings within one health care organization, which has one set of policies and procedures for all areas. However, variations between local health areas could be reflective of such things as different leadership and supervision styles, different historical approaches to service delivery, or individual PHN interest and expertise. I have chosen an embedded design in order to examine the circumstances within one health authority that provide direction to several different but related health unit offices. This single health authority was therefore the case, and three individual local health areas within that health authority were the separate embedded units of analysis. In this situation, it may provide an opportunity to determine whether past provincial and regional district directives regarding practice expectations have led to differences in services and therefore different health outcomes.

### **Strengths and limitations of case study.**

Case study provides an opportunity to study the extensiveness of real life and the fullness of experiences (Yin, 2009). A case study method can be used to add to our knowledge of phenomena at the individual, group, organizational, political, and social levels (Yin, 2009). Despite those views, case study is sometimes held in low esteem, often because it is poorly understood (Gerring, 2004). One of the greatest concerns about case study research has been the lack of rigor as a result of poor investigator technique, biased views, or equivocal evidence, all of which may affect study findings (Yin, 2009). However, case study designs often employ a combination of data collection methods allowing for triangulation, which uses several different sources of evidence to increase the rigour of a study (Merriam, 1988; Stake, 1995; Yin, 2009).

Stake (1995) notes that case study design is not chosen with the intent of producing generalizations, but case studies may produce valid modifications of generalizations and increase confidence in them. As well, case study is ideal for the rigorous test of falsification used for scientific propositions by explaining how a single example can prove a theory wrong (Flyvbjerg, 2011). Yin (2009) clarifies that case studies are generalizable to theoretical propositions, but not to populations. Like a single experiment, a single case study does not represent a 'sample', however it does contribute to the expansion and development of theories (Yin, 2009). Yin (2009) also notes that case studies can contribute valuable evidence to complement experiments by explaining 'how' and 'why' an intervention works.

The issue of bias is a concern for case study investigators given their prior in-depth understanding of a case, however it is important for them to be open to contrary findings by reporting their preconceived views and revising their hypotheses as they consider their findings (Flyvbjerg, 2011; Yin, 2009). In a case study design, the accepted role of participant-observers

includes the contribution of their own experience and understanding to the process, adding to the richness of understanding (Merriam, 1988; Stake, 1995; Yin, 2009). This is the stance that I have taken for this case study because of my background with public health nursing in this health authority.

Understanding these various strengths and limitations was very helpful in informing my decision to use a case study methodology. The unique strength of a case study approach is the ability to deal with a wide range of evidence including interviews, documents, and participant observations (Yin, 2009). My intent was to seek information that would explain how and why certain organizational aspects within one health authority had an impact on public health nursing services with priority perinatal women. Although it was not my primary intention to generalize the findings of my research project, it may turn out that some information could be applicable to other regions or health authorities, or this may prove to be a snapshot in time providing a benchmark against which to assess future changes. I believe that a case study methodology is well suited to the exploration of factors that influence the effectiveness of PHN practice. However, as with any research methodology, case study needs to include procedures that are important to ensure validity and credibility (Yin, 2009).

### **What is my case?**

For the purposes of this research proposal, this case was defined as the part of one BC health authority that encompassed the Child Youth and Family program, of which PHN programs were a part. Within that health authority were fourteen individual local health areas (LHAs), three of which were chosen as separate embedded units of analysis representing three different geographical areas of the health authority region. Using an embedded approach facilitated

demonstration of variation between LHAs, which may then enable a better understanding of any differences in outcomes between settings within the health care organization.

Using one health authority organization as the case recognizes the overarching policy and program direction established for all the LHAs within it. However, each site has a different organizational history in addition to different leadership, and each site has approached the provision of service to priority perinatal families in different ways, such as assigning PHNs to work in geographical districts, or in focused teams of expertise. The use of three different sites demonstrates some variations in the rates of the three outcomes of interest, thereby shedding light on the effectiveness of PHNs in each setting. By providing an in-depth description and analysis of the real-life circumstances in which PHNs provide support to priority perinatal families, and by examining multiple sources of data in different settings within a single organization, I believe the use of a case study design enabled a richer understanding of organizational influences on the effectiveness of PHN work, and provided an important contribution to nursing knowledge.

### ***Units of analysis.***

For this case study, the unit of analysis is the public health nursing program for perinatal services as it is delivered in three different local health areas within this health authority. Using three different areas within one health authority provided an opportunity to examine outcomes from a larger geographic area, and to hear from PHNs with a range of different views about how organizational factors have influenced their practice. Related to this group, the case includes those priority perinatal women who gave birth between January 1, 2009, and December 31, 2010, and who received five or more contacts from PHNs prenatally and up to two years following birth. This time frame was chosen because it falls just prior to a major change in the

provincial integrated public health information system. Such a timespan permits a group of children born over a two-year period to have reached their second birthday. This allows for the completion of the infant immunization basic series, and reflects the WHO's goal of breastfeeding for two years and beyond. It also provides an opportunity to assess the level of household tobacco use. All three aspects are routinely assessed and documented by PHNs in iPHIS at each childhood immunization clinic visit up to 18 months of age. The collection of data from these sources across one health authority addresses the research question about the three outcomes of interest. Added to that, the interviews with PHNs and the review of guiding documents provided an opportunity to explore organizational factors that affected the ability of PHNs to support priority perinatal women. Together these multiple sources of evidence contributed to the investigation of the real-life context of PHN services provided to priority perinatal women.

## **Part II – Mixed Methods in Case Study Design**

In this research project, both quantitative and qualitative data were used within a case study design to explore key outcomes among priority mothers, along with the organizational influences that PHNs believe affected their ability to support women in achieving those outcomes. Quantitative and qualitative approaches differ in the ontological and epistemological principles that support them, as well as in the strategies used to gather and analyze data, and in the ways of judging the credibility of findings (McEvoy & Richards, 2006). Typically, quantitative approaches that incorporate standardized measures and statistical analysis are associated with a positivist or post-positivist paradigm in which the goal is to identify generalizable laws (McEvoy & Richards, 2006). On the other hand, qualitative research approaches use non-numerical information, and are usually linked to the interpretivist paradigm, without the intention of identifying generalizable laws but rather to develop a greater understanding of a specific

situation, or a theoretical generalization (McEvoy & Richards, 2006).

Whether or not quantitative and qualitative methods should be combined in research has been the subject of much debate (Biesta, 2010; Howe, 1988; McEvoy & Richards, 2006); however, many agree that a mixed methods approach is philosophically acceptable (Greene, 2007; Howe, 1988; Johnson & Onwuegbuzie, 2004; McEvoy & Richards, 2006; Risjord, 2010; Teddlie & Tashakkori, 2010). The use of mixed methods research is supported by the philosophical perspective of critical realism, in which the goal of research is to develop deeper levels of understanding and explanation by recognizing the interaction between mechanisms, social structures, and human agency (McEvoy & Richards, 2006).

### **What is mixed methods research?**

Mixed methods social inquiry involves a range of philosophical paradigms, theoretical perspectives, methodological approaches, as well as data collection and analysis methods (Greene, 2007). Mixed methods research is the mixing of qualitative and quantitative research techniques, methods, concepts or language into a single study (Johnson & Onwuegbuzie, 2004). Researchers using mixed methods select and integrate the most appropriate techniques from qualitative and quantitative approaches (Teddlie & Tashakkori, 2010).

### ***Strengths and limitations of mixed methods research.***

Over time researchers have come to recognize some of the advantages and disadvantages of a mixed methods approach. Advantages include the ability to answer research questions that are not possible with other methodologies, the chance to provide stronger inferences, and a greater opportunity to present a range of diverse and different views (Teddlie & Tashakkori, 2010). Many research methods have their flaws but usually these flaws are not the same in each approach (Brewer & Hunter, 2006). This diversity of imperfection allows for the combination of

individual strengths as well as compensation for their faults (Brewer & Hunter, 2006). Despite that view, some scholars believe that the mixing of methods is not appropriate because of differences in ontological and epistemological perspectives.

***What is mixed in mixed methods research?***

There are a number of different ways that mixing can occur in mixed methods research. Biesta (2010) suggests that mixing can happen at the ontological or epistemological level, at the design level, the methods level, at the data collection level, or at the analysis level. In using mixed data collection and analysis methods, as I have done for this case study, Sandelowski (2014) describes three basic types of mixing. These are using quantitative and qualitative elements together, linking them, or actually integrating them. The approach I used is the linking approach where quantitative and qualitative elements are placed in juxtaposition to each other in order to confirm, refute, or modify each other (Sandelowski, 2014). The quantitative findings about outcomes from the iPHIS administrative database are further explained by the qualitative findings from interviews with PHNs, as well as the analysis of policy documents related to PHN practice.

In this case study, the timing of the two forms of data collection were concurrent because I believe that having the outcome rates to share with participants could have influenced their responses to questions regarding the services they provided. For this reason, I collected both quantitative and qualitative data at the same time, or at least without specifically seeking one before the other, as neither was dependent on the other. The iPHIS administrative database, however, was the primary source of quantitative data because this is what managers always have available to them to assist in program decision making.

### **Part III– Data Collection Methods**

#### **Quantitative data collection.**

The study for the quantitative portion of this project involved a retrospective review of anonymous electronic client records from three local health areas within one health authority. Upon receipt of ethics and operational approvals, an application for electronic health record data from iPHIS was made through a data access request at the BC Centre for Disease Control (BCCDC) (BC Centre for Disease Control, n.d.), where this information is stored. BCCDC hosts and operates the iPHIS/Panorama system for the province of BC, and has a policy outlining access protocols for research purposes (BC Centre for Disease Control, 2017). The iPHIS Governance Council at BCCDC has representation from each health authority, and makes decisions regarding access to iPHIS data for research purposes (C. Yaskow, personal communication, November 9, 2011). The kind of data obtained from BCCDC is considered to be administrative data, and its use in research requires some discussion.

#### **Administrative data use in nursing research.**

For the purposes of my case study, I used information from the administrative database called iPHIS (integrated public health information system), which was established in British Columbia in 2000 for use by PHNs as way to document client information. Although a newer program called Panorama replaced iPHIS in 2013, the information from iPHIS has since been incorporated into Panorama. For the purposes of this study, I refer to the database as iPHIS, because that was the documentation tool in operation during the timeframe of this research project. In the health authority that I examined for this case study, and in which I worked, iPHIS was routinely used by PHNs to document maternal and child services delivered by PHNs, including all childhood immunizations and related clinic services. This database includes

demographic and personal care information about women, children, and families that were involved with the health authority's public health units. Intended primarily for documentation of communicable disease and immunization information, this health authority also used the broader components of iPHIS to document a wider range of PHN services. Over time iPHIS, as a database, grew to contain a broad range of information about the health of individuals and families who received services from PHNs. Individuals who use the services of the health authority are informed that under the Freedom of Information and Protection of Privacy Act of B.C. (B.C. Laws, 2015) their information may be used for research purposes (Vancouver Island Health, 2007, 2014).

A search of the literature for “integrated public health information system” and “iPHIS” revealed a small number of research articles dealing primarily with immunizations or communicable disease issues, but none related to other aspects of health. It was my view during development of the methodology that, as a source of administrative data, iPHIS could provide a source of information that would support my research questions, and that may be able to support PHN practice decisions at the local level, as well as policy decisions at higher levels in a health care organization.

### ***What are administrative databases?***

Administrative databases are large bodies of information collected for monitoring and documentation purposes in organizations, often representing large populations, and which have the potential to influence policy development (Lavenda et al., 2011). In health care, administrative data usually involves information collected about individuals or groups, and may describe small or large populations (Smaldone & Connor, 2003). Administrative data sets have been used for research purposes to explore issues such as regional differences in care and health

outcomes, and because of their size, such databases can improve the generalizability of research findings (Smaldone & Connor, 2003). Large administrative or clinical databases are an efficient way to collect data, but their utility for research purposes depends on the quality of the data, as well as the nature of the research being undertaken, because their primary purpose is not research (Malay, Shauver, & Chung, 2012). As an alternative to clinical trials, however, databases provide a reasonable substitute because of their large size, accessibility, and time span (Malay et al., 2012).

Data from several sources can also be linked providing large sample sizes at relatively low cost to review events occurring to individuals and families over time and intergenerationally (Doiron, Raina, & Fortier, 2013; Jutte, Roos, & Brownell, 2011). Data linkage is the bringing together of information from different sources that relates to the same individual or family (Jutte et al., 2011; Randall, Ferrante, Boyd, & Semmens, 2013). A wide range of health information can be linked at the individual level including hospital information, maternal care, birth records, immunization records, and nursing records (Jutte et al., 2011). For example, the Families First program in Manitoba screens newborns by linking with maternal history, or risk factors such as prenatal alcohol and tobacco use (Manitoba Centre for Health Policy, 2007). Using anonymized and unique identifiers, linked administrative data already collected for other purposes can be used for academic research (Jutte et al., 2011).

Although not originally intended for research, administrative data sets have become useful for research in health services for several reasons (Smaldone & Connor, 2003). Data representative of care already delivered can be important in the search for patterns of health service (Smaldone & Connor, 2003). Longitudinal data sets are helpful in tracking information over time and across different settings, and because they often already exist they may be easily

accessible (Smaldone & Connor, 2003). As well, given that administrative data sets tend to be population based, the problem of selection bias is avoided (Finlayson & Birkmeyer, 2009). Because public health nursing practice is population health-oriented, evidence-based, and outcome-driven, secondary analysis of such population health data is an excellent way for nurses to increase their knowledge of overall service delivery outcomes (Garmon, 2007).

The analysis of data collected for purposes other than research, or using data previously collected for another study is known as secondary analysis (Burns & Grove, 2009; Jackson & Verberg, 2007; Vogt, 2005 as cited in Garmon, 2007; Windle, 2010). In social sciences, common sources of secondary data include such items as organizational records, client charts, census data, and surveys (Windle, 2010). Secondary analysis is practical and cost effective, and may provide a larger and higher quality database than an individual researcher might be able to collect, as well as providing a snap shot capturing past developments or changes (Garmon, 2007; Windle, 2010). However, unless issues of data quality, appropriateness, and representativeness are addressed, secondary analysis may be associated with issues affecting the reliability and validity of evidence to support nursing practice (Garmon, 2007; Jackson & Verberg, 2007). The reliability of data is related to the accurate and consistent manner in which data are collected, and validity is concerned with the availability of information related to the variables needed to address the research questions (Garmon, 2007; Malay et al., 2012).

### ***Strengths and limitations of administrative databases.***

Despite the vast amount of information they contain, established administrative databases have limitations for secondary analysis. To begin with, gaining permission and access to an administrative database can be time consuming for researchers. Since administrative databases are not designed for research purposes, the confidentiality of information needs to be addressed,

which usually involves a special agreement with the source agency (Lavenda et al., 2011). The structure of a data set may not capture key variables of interest, and data may be of questionable accuracy and completeness (Lavenda et al., 2011; Smaldone & Connor, 2003; Windle, 2010). Other limitations include coding errors, such as inconsistent approaches to documentation among care providers, the degree of information about specific outcomes, and a lack of subjective information about individual clients (Malay et al., 2012). Although administrative databases provide an opportunity to explore variations in population based rates of health care procedures, they may not answer fundamental questions regarding correct or appropriate care (Finlayson & Birkmeyer, 2009).

With the vast amount of information contained within iPHIS, there is much that could be learned about the services provided by PHNs. Information from such health record databases as iPHIS, is a way for nurses to identify practice patterns and to compare them against local benchmarks or national standards (Cheung, Moody, & Cockram, 2002; Rumay Alexander, 2007). Quality of care and patient safety can be improved by using information about nursing interventions and client outcomes (Goodwin, VanDyne, Lin, & Talbert, 2003). Associations between health information, risk factors, and health outcomes can inform policy development and resource allocation decisions (AbouZahr & Boerma, 2005; O'Carroll, Powell-Griner, Holtzman, & Williamson, 2010). This kind of information would be particularly valuable to any health authority in its quest to provide excellent service.

Although iPHIS had been used by PHNs in this Health Authority for at least 12 years, and nurses were familiar with the system, its structure allowed for a wide range of entry options resulting in inconsistent approaches to documentation, which resulted in errors, but which also reflected the real-life context of PHN practice. Moreover, it was the only data available to the

organization upon which to base programming decisions.

Technology-induced error is a risk that may occur in complex work situations (Kushniruck & Borycki, 2011), including those encountered by PHNs during busy baby clinics with multiple distractions. Human factors can affect the nature of information collected. For example, data from home visits entered several hours after the fact may be subject to transcription error, memory lapse, or actual loss of the paper note (Kushniruck & Borycki, 2011). These scenarios are a concern for data quality as well as client confidentiality. Inconsistent approaches and use of non-standard language in data entry allows for undefined entries or lack of information in the correct location. Using nationally standardized languages allows nursing data to be compared with other health organizations across the country even when the data collection systems are different (Lunney, Delaney, Duffy, Moorhead, & Welton, 2005; Monsen & Kerr, 2004).

The iPHIS system used at the time of this data collection was modeled on the previously used paper record, and at the time no standard language was developed. A documentation manual has since been created with local and provincial documentation standards; however based on my experience, it had not been the practice in this health authority to regularly monitor data standards, or to provide feedback to users about quality in perinatal programs. In addition to good data quality, health care organizations need to ensure that there is capacity within their system to have staff with the appropriate statistical skills to properly analyze data, and not assume that healthcare providers can take on this duty along with client care or other program demands (AbouZahr & Boerma, 2005). One of the limitations of the current integrated public health information system used in the health authority is the lack of integrated information about staffing levels, community population figures and changes, finances, and organizational changes in practice over time. Without this additional information, analysis of numbers alone does not

provide the complete picture.

***iPHIS administrative data.***

For the purposes of this project, information related to mothers and their infants was requested for all births during the period of January 1, 2009 to December 31, 2010, in three local health areas. The time frame identified for data collection allowed for a group of children born over a two-year period to have reached their second birthday. Infant feeding practices, household tobacco use, and immunizations were expected to be routinely assessed and documented by PHNs in iPHIS at each childhood immunization clinic visit up to and beyond 18 months of age. The period from 2009 to 2012 was chosen for this study because it reflected the most current PHN practice prior to a major shift in both documentation tools and perinatal home visiting practices within the health authority.

I requested line listings of all births linking mother and baby records, starting from the first contact and going up to 24 months postpartum. This anonymous client data included information from selected record fields for each encounter type, as described in Table 2. For these three local health areas, records for a total of 2685 mothers and 2785 children were reviewed, involving a total of 74,906 individual line entries.

**Table 2**  
***Data Fields from iPHIS***

<b>iPHIS record type</b>	<b>Data fields from mother's record</b>	<b>Data fields from infant's record</b>
Notice of birth	Birth date	
(provided as mother's component and child's component)	Multip/primip	
	Encounter/ appointment type	
	HLTH 184 score	
Postpartum assessment screen PSTA	Breastfeeding	
	Tobacco use	
	Encounter/ appointment type	
EDCO	Prenatal weeks & gestation	
	Encounter/ appointment type	
Newborn record NWBA		Breastfeeding at discharge
		Feeding - breast milk
		Feeding - formula
		Feeding - mixed milk
		Encounter/ appointment type
Early childhood record ECHA		Local study – exposure to second hand smoke
		Encounter/ appointment type
		Feeding - breast milk
		Feeding - formula
		Feeding - mixed milk
Immunization Record		Immunization agents

Although this project focused on client records and not on actual people, there are clearly individuals behind each record. In this health authority, during the study timeframe each new client was routinely given a handout with information about the collection and use of their personal information based on the BC Freedom of Information and Protection of Privacy Act (BC Laws, 2015). This explanation included, among other things, the use of personal information to help improve care and services, and for research purposes (Vancouver Island Health Authority, 2007, 2014). This process paved the way for the use of records in the iPHIS system from this Health Authority, and eliminated the need to contact each individual involved

to recruit them for the study.

***Inclusion and exclusion criteria.***

Only records for those mothers who had live births from January 1, 2009 to December 31, 2010, and who continued to reside in the local health areas for the two-year data collection period were reviewed. As well, records for children linked to those mothers were included up to their second birthday. The iPHIS system did not track any Ministry for Children and Family Development (MCFD) removals or adoptions, so consequently the Provincial Health Services Authority (PHSA)/BCCDC Panorama Central Support Team were unable to verify if any of the children were in the care of MCFD.

Some records were excluded from the study. This involved records where the mother or infant had died, or where families had moved out of the local health areas identified for this study. Additionally, data for a number of children were removed where there were no links between the mother and child, or where the parent or guardian name was different from that of the birth mother.

***Outcomes of interest.***

The outcomes of interest for the quantitative part of the research project included breastfeeding initiation and duration, postnatal household tobacco use, and infant immunizations. These are the outcomes identified in the first research question, and are those areas that PHNs strive to support priority perinatal women in achieving.

Information on breastfeeding initiation was collected at the initial postpartum PHN contact and documented on the mother's postpartum record and on the infant's newborn record in iPHIS. The number of women who initiated breastfeeding was important to use as baseline information in relation to the numbers of women who continued to breastfeed their children. Breastfeeding

duration was defined by the response to a question about infant feeding at each immunization visit, and was recorded in relation to the child's age on the child's newborn and early childhood record. Further information related to breastfeeding duration was routinely documented in iPHIS at each PHN contact and at five routine infant immunization appointments, following discussion with the mother or caregiver. Documentation of the exclusive nature of breastfeeding was not routinely done by PHNs, however notation of any breastfeeding, exclusive or not, was recorded in the child's early childhood record as a *yes* or *no* at each encounter.

In addition to breastfeeding information, household tobacco use was also questioned at each childhood immunization visit. Household tobacco use was defined as a positive response to a question about the child's exposure to second hand smoke in the household, asked by the PHN of the mother at each prenatal, postnatal, and immunization clinic visit. This information was noted as a *yes* or *no* response on the child's early childhood record in iPHIS.

Infant immunizations were directly recorded in iPHIS on the date given and in the child's immunization record. By 24 months postpartum it was possible to determine whether the infant series was complete or not, based on the basic immunization series as defined by the BC Centre for Disease control. This information, recorded in iPHIS, is expected to be reliable because documentation of nursing services is a required standard of practice (CRNBC, 2008).

### ***Identification of the priority population.***

It was the practice of PHNs in this health authority to provide additional and ongoing contacts with those women who appeared to be negatively affected by the social determinants of health. Guiding documents used in this organization provided information and direction to PHNs regarding those women who needed more than the usual care offered to new mothers, who needed additional support based on their social circumstances. Unfortunately, the documentation

of the nature of individual client risk factors was not consistently captured in iPHIS, so an alternate approach was taken.

Based on the data received from BCCDC, the only way to distinguish the priority population was by identifying women who received five or more PHN contacts in the postpartum period. The usual practice for most new mothers was to be offered one or two postnatal visits or contacts from PHNs, along with a possible further contact to assess for postpartum depression at six or eight weeks. However, women identified as being in the priority perinatal population because of their social risk factors often received many more contacts in the postnatal period. The decision to use five or more postnatal contacts as the determination point for priority status came after consultation with health authority PHNs experienced in the field, a review of guiding documents, and my own experience in the organization. Although PHNs identified some mothers during pregnancy as being a higher priority, many other high priority mothers were only identified during the postpartum period. Regardless of when PHNs identified priority mothers, the number of postpartum encounters reflected the level of concern that PHNs recognized. For this reason, I chose to use the frequency of encounters during the postpartum period as means to determine priority status. It is this determination of priority and non-priority groups of mothers that forms the basis of the first research question regarding the three outcomes of interest.

### ***Data preparation.***

The request for iPHIS data was submitted to the Panorama Data Governance committee for review on November 24, 2015, and was approved on December 8, 2015. Data from iPHIS records was then compiled by the PHSA /BCCDC Panorama Central Support Team at BCCDC and sent to me electronically on March 31, 2016, in a de-identified form. This included seven Excel files for each of three LHAs, for a total of twenty-one files. By that time all client records

had been migrated from the original iPHIS program to the newer public health information system known as Panorama.

Prior to the release of the data some cleaning had taken place at BCCDC. This involved a routine quarterly quality audit by BCCDC of selected aspects of iPHIS data with a focus on family name formatting and immunization recording. Health areas were notified of quality issues on an ongoing basis, and were responsible for correcting problems and returning the updated information to BCCDC (C. Aiken, personal communication, Mary 29, 2015).

Once the data for this project was received from BCCDC, I did further data cleaning as files were combined to create one master file for each of the three LHAs. This cleaning process involved a variety of steps using Excel software to sort and search for anticipated and observed issues. First I used the ‘find’ feature in Excel to search for any date entries outside of the study time frame. Any records found with a child’s date of birth outside of the two-year period were eliminated along with the related maternal record. Any individual line entries with encounter dates or immunization dates outside of time frame were also eliminated. In the columns relating to breastfeeding a search was made for any text other than *yes* or *no*. Where entries inferred the presence of breastfeeding, such as OBS (for observe) or NAP (for no apparent problem) the entry was changed to *yes*. Each text entry was assessed and assigned to the appropriate breastfeeding category. Once all entries were reviewed, the *yes* entries were replaced with “1” and the no and blank entries were replaced with “0”. The iPHIS documentation program allowed for free text entry into some fields with the result that entries for the ‘local study’ field, which captured the household tobacco information, ended up with a wide range of words or phrases reflecting either the presence or absence of smoking. Rather than a *yes* or *no* response to the question of ‘is there a smoker in the household’ there were a wide variety of entries such as “father smokes”, “quit

last week”, “outside” or even typos such as “smking”. Where such errors were found, they were individually assessed and corrected to reflect the intended information. As with the breastfeeding information, all indicators of household tobacco use were replaced with “1”, and all indicators of no household tobacco use, along with all blank entries were assigned a “0”. Numerical indicators were used in preference to text to facilitate later statistical analysis in SPSS. Immunization data required no modifications, as each vaccine was dated and documented individually.

Master files were created in Excel to compile cleaned and relevant data for each local health area. The detailed steps involved in this process are included in Appendix G. The master files included all relevant data for each mother and child based on unique numerical identifiers for each mother and for each child. Matching these unique identifiers across the seven different records supplied by BCCDC allowed me to link together all the information for each mother and child pair. It also enabled me to identify any multiple births or siblings born within the same two-year period. A new column was added to each master file to calculate the number of postpartum encounters for each mother. As discussed earlier, it was determined that the level of five or more postpartum encounters would establish the difference between priority and non-priority mothers, with priority mothers receiving the higher number of encounters. By sorting on the mother’s identification number, followed by the child’s identification number, I grouped each mother with her particular child or children. By further sorting on the number of postpartum encounters, I identified the complete mother and child data sets for those receiving five or more postpartum encounters. These were separated and saved in new files with a priority designation, so each local health area now had a priority file and a non-priority file.

With each priority and non-priority group identified for each local health area, I proceeded

to count the three outcomes of interest. This involved the addition of several new columns in the Excel files, in which specialized formulas were used to calculate outcomes at 18 months following each child's date of birth. Data about each outcome of interest was initially documented by PHNs at several different encounter dates, and in different areas of either the mother's or child's record. For example, to determine which mothers were breastfeeding at birth, I developed a formula that counted breastfeeding indicators across both the mother's postpartum record and the child's newborn record, and returned a positive indicator if there was any mention of breastfeeding. This process was necessary as it became apparent that breastfeeding documentation was sometimes not present in one area, but was in another. Both the child's newborn record and the mother's postpartum records were designed for use for the first six weeks after birth, and both had areas that recorded the method of infant feeding.

Other records were used for documenting infant feeding at later periods of time. The early childhood record (ECHA) was used for children for the period from six weeks to four years, while the education assessment record (EDCO) was used for documenting any further information about mothers outside of the postpartum period. This same process allowed me to count indicators of household tobacco use, through the use of a previously established local study field, and childhood immunizations over the next 18 months based on information contained in the child's ECHA and immunization records. Once the frequency count of these indicators was completed for each of the priority and non-priority groups, the results were compiled into a summary table for statistical analysis.

### **Qualitative Data Collection**

For the purposes of this case study, quantitative and qualitative data were collected independently of each other, and were not dependent on any particular sequence. In this inquiry,

I conducted semi-structured interviews with PHNs and PHN leaders who had experience working in any of the three local health areas, and who were involved in providing services for priority perinatal women and their families, or providing supports for PHNs who provided direct care for those families during the time frame established for the quantitative component. I also examined provincial, and health authority documents related to that time frame that participants identified as being ones that guided their practice. As a member of this health care organization at the time, I also added my perspective as a participant observer, by compiling and coding field notes and memos that included my recollections and experiences as a manager of PHN programs in this health authority during this timeframe. The first step, however, involved seeking PHN volunteers willing to talk about their experiences working with priority perinatal women.

***Recruitment process.***

Operational and ethics approval was obtained on October 21, 2015, so advertising for participants began with the offer of an in-person presentation at PHN staff meetings in each of the three local health areas. Two of the three LHA offices subsequently invited me to speak about this research project. This was followed by e-mail invitations to potential participants including those recently retired, sent by an administrative assistant working in one of the three offices, acting as a neutral third party. Posters advertising the project were sent to each of the offices in the three local health areas. Those interested in participating were invited to contact me, as the primary investigator, by phone, or e-mail, for further information regarding the study. The recruitment poster and recruitment invitation are included as Appendix C and D respectively.

***Inclusion and exclusion criteria.***

PHNs, clinical coordinators, and nursing leaders who were involved in supporting front line

PHNs, or delivering direct service to priority perinatal families during the period of time from January 1, 2009 to December 31, 2012, and who worked in any of the three local health areas were invited to participate in this study. Staff who did not work in any of these three local health areas, and those who did not directly support or deliver perinatal care during that period were excluded from this study. Only documents related to PHN practice, and the delivery of services to perinatal women were included in this study.

*Informed consent.*

Once individual PHNs had indicated their interest in participating in the study, they were sent a copy of the informed consent document with instructions on signing it and returning a copy to me. The three-page informed consent document is included in Appendix E. Informed consent for interviews was obtained through an e-mail invitation, a verbal explanation, and a signed consent form. The informed consent document was e-mailed to interested participants, and prior to any interviews, an opportunity was provided to ask questions, and to sign the consent form if they wish to participate. A copy of the signed consent form was provided to each participant, and a copy was scanned and kept in an electronic file on a password-protected computer.

*PHN Participants.*

Recruitment of participants began in November 2015, and was completed in May 2016. A total of sixteen individuals agreed to be interviewed. This included six from each of two LHAs, and four from the third. Twelve of the participants were front line PHNs, and four were in leadership positions. Of the group of sixteen, twelve were currently practicing and four had retired within the last three years, but had worked as PHNs between 2009 and 2012. Participants ranged in their years of general nursing experience from eleven to more than thirty years, which

included a range of public health nursing experience from five to more than thirty years. All participants had a baccalaureate degree in nursing, two had additional university degrees, and all had a range of additional education in the form of workshops, courses, and certificates.

The interviews with PHNs and PHN leaders were arranged for a time and location convenient to each participant. The interviews ranged from 45 to 90 minutes, guided by the availability and interest of the participant, with most lasting about 60 minutes. In recognition of the time involved, a \$10.00 Thrifty Foods gift card was given to each participant, with only one person declining it. Five of the interviews were done in person, while eleven interviews were conducted by phone. All interviews were recorded electronically using two digital audio recording devices belonging to the researcher. The digital recordings were saved to a secure shared drive at the University of Victoria.

### **Interview design.**

In order to get a good understanding of the context of service provision, I sought the perspective of the PHNs who delivered service to vulnerable perinatal women, along with the perspective of PHN leaders who were involved in program planning, management, and support. The approach used for semi-structured interviews involved an outline of topics along with suggested questions (Kvale & Brinkmann, 2009). In general, the choice of particular questions and their sequencing is dependent on researcher judgment at the time of the interview, and on possible new directions that may be opened up by the responses of interviewees (Kvale & Brinkmann, 2009).

For this project, interview questions were developed based on the established research questions, and included demographic and background information to capture the nature of each participant's experience. The questions focused on organizational factors that guided and

supported PHN work with perinatal families. Further questions were asked about the kinds of individual, community, and systems level activities with which they may have been involved that related to the three outcomes of interest. PHNs were asked specifically about the nature of their practice with priority perinatal women in relation to breastfeeding, tobacco, and immunization support. They were asked if they felt they had made a difference with these women, and how they would know this. Finally, they were asked about organizational factors, such as communications, problem solving approaches, and guiding documents that they thought might have had a bearing on their ability to provide services for priority perinatal women. A complete list of the questions is included in Appendix F.

### **Guiding documents.**

There are a variety of provincial, and health authority documents that have guided PHN practice with vulnerable families. Many of these documents contained information pertinent to my research question, and were obtained either from participants or from various websites. In this case study, a total of fourteen provincial and health authority level documents related to PHN practice were included in this study.

Yin (2009) notes that in case studies one of the main uses of documents is to substantiate and strengthen evidence from other sources. It is important, however, to remember that often documents used as sources of data have not been developed for research purposes, and as a result may be incomplete or contain unanticipated biases (Stake, 1988). Therefore, it is worthwhile to consider the origin, context, purpose, and author of documents used as a source of data (Stake, 1988).

The provincial government provided general expectations to all provincial health authorities, through such documents as the Framework for Core Functions in Public Health (BC Ministry of,

2005), or the guidelines and standards from Perinatal Services BC (Perinatal Services BC, 2011). These documents would have been available for consultation to managers and front line PHNs during the time frame of this inquiry. The CH1 job description was a provincial level document with minor health authority modifications. At the Health Authority level, policies and protocols were established to support the overall delivery of services for perinatal families, as well as for priority perinatal women. The guiding documents that provided further insight about the direction expected of PHNs in this health authority, in relation to services for priority perinatal women, are included in Table 3. These documents were included in this study because they were identified by participants as ones that guided their practice, and although PHN practice was similar across the health authority, there were sometimes different approaches taken in each local health area over the years.

One of the advantages of using documents in my retrospective study is that when interviewees did not remember the particular details of direction for the time frame of interest, such documents helped to verify the organization's intentions at the time. Data from documents were used in the same way as that from participant interviews by providing descriptive information, providing historical understanding, and providing an objective and consistent source of information (Stake, 1988).

**Table 3**  
***Guiding Documents***

1. South Area Practice Guidelines – Women at risk. (2007)
2. BC Model Core program – Reproductive health and prevention of disabilities. (2009)
3. BC Model Core program – Healthy infant and child development. (2009)
4. BC Core programs – Evidence Review: Reproductive health. (2008)
5. Perinatal Services BC – Community Liaison Record – Priority Screening form. (2011)
6. Perinatal Services BC – Tobacco Use guideline. (2006)
7. HEABC Public Health Nurse CH1 Job Description. (2012)
8. Health Authority Child Youth and Family Perinatal Logic Model. (2006)
9. Health Authority Child Youth and Family Logic model for high risk perinatal women. (2010)
10. Health Authority Child Youth and Family Management Logic Model. (2006)
11. Health Authority Child Youth and Family Logic Model, Introduction. (2006)
12. Health Authority Child Youth and Family Perinatal Practice Guideline: Community Perinatal Health Support for Priority Populations of Women and Their Families. (2010)
13. Health Authority Child Youth and Family Supporting document for Perinatal Practice Guideline: Community Perinatal Health Support for Priority Populations of Women and Their Families. (2010)
14. Health Authority Child Youth Family Central / North Perinatal position paper. (2007)

**Demographics.**

The three communities examined in this case study involved one large suburban area, and two smaller rural-urban areas geographically separated from each other. To maintain the

confidentiality of PHN participants, the identification of these three areas has been protected. Although staffing levels for PHNs in each office were available, this information was not used in this case study as it would be difficult to assess its value relative to the three outcomes of interest. Each community had a different level of community need and resources that contributed to the overall services available to families. As well, it was not the purpose of this study to compare the three areas against each other, but rather to gain a picture of the effectiveness of services offered to priority perinatal women across the wider health authority.

Staffing levels and local demographic information often have a bearing on the nature of services provided in communities. In smaller communities, there may have been fewer PHNs to serve a large geographic area, with the result that a full range of services was not always available. For example, in a community with very few births it was difficult to deliver regularly scheduled prenatal classes in the same way that they might have been offered in a larger centre. Service priorities within health unit offices may have been aligned differently in relation to population needs, and over time, these priorities may have changed depending on the direction of local management.

### **Participant observation.**

As a manager of such services over many years, I have seen how various factors influenced the priority and nature of programs and services offered in different communities. My knowledge and experience has given me a perspective that contributes to the exploration of how organizational factors affected the work that PHNs did, and how that work, in turn, affected the rates of breastfeeding, infant immunizations, and household tobacco use among the population of priority perinatal families. This experience placed me in the role of a past insider participant observer to the extent that during the timeframe outlined for this case study, I was a manager of

some of the health unit offices, however I was not in the role of researcher at that time.

Although bias may be considered a weakness of this approach, an advantage is the insight that is gained through familiarity (Yin, 2009). Given the retrospective nature of this case study, and the fact that I no longer work for this Health Authority, my contributions involved recollections of a broader understanding of organizational factors and current events that may have had some bearing on the day-to-day service delivery. Although the organization may have changed since the time I left the health authority, my comments and observations are based on my experiences as a manager during the same timeframe as this study, from 2009 to 2012. I incorporated my reflections through memoing and reflexivity, writing down my memories, reflecting on my role in this experience, and later coding these insights in such a way as to identify them as my own contributions to assist in elucidating the broader picture and providing background. As the sole researcher in this case study, it was important to reflect on my role in collecting and interpreting data from an organization of which I had been a part. This process of reflexivity, setting aside my values to more accurately describe the experiences of participants (Ahern, 1999), is discussed in the next section.

### **Reflexivity.**

Reflexivity has been defined as “thoughtful, conscious self-awareness”, and involves an ongoing evaluation of personal responses to the research process and the participants involved (Finlay, 2002, p.532). The process of reflecting on one’s own research to better understand how their perspective might influence the findings is important to strengthening credibility (Jootun, McGhee, & Marland, 2009). Reflexivity is a valuable way to examine the viewpoint of the researcher, to consider insights generated from personal experiences, and to offer scrutiny of the various research decisions made along the way (Finlay, 2002).

Reflexivity needs to be considered at each stage of the research process when decisions are made (Cutcliffe, 2003; Dowling, 2006). This can be done through the use of field notes, journaling, and analytic memos to track reflections and choices made throughout the process of data collection and analysis. I used these methods as I worked through the process of coding and analyzing the interview and document data. I also documented my decisions with regard to cleaning the quantitative data that sometimes required interpretation, recognizing that it is important to be clear about the ways in which the researcher's background could affect both data collection and analysis (Jootun et al., 2009).

It is acknowledged that the role of a researcher can affect the relationships with participants, which can then affect the outcomes of research (Jootun et al., 2009). In my capacity as a past manager of PHN programs in this health authority, I was aware that my position might have an impact on what PHN participants felt comfortable in telling me. The PHNs who did participate all did so voluntarily, and I encouraged them to be honest and straightforward in their interview responses, as I was no longer an employee of the health authority. During the interview process, I was careful to use neutral terms when asking about organization influences that affected their ability to support priority perinatal women, and I encouraged them to speak freely about issues of concern they might have had.

In the process of gathering and analyzing the PHN interview data, I provided some limited background information because of my experience with the health authority. My intent was not to highlight my personal experience, but rather to offer context and understanding to the information generated by PHN participants. By using reflexivity throughout the research process, I hope to have made the process more visible and transparent. It has helped me to become more aware of my relationship with the participants, and to the research topic, and has

made me more conscious of the potential influences I may bring to the analysis of my data (Dowling, 2006).

### **Ethics.**

Before any data could be collected for this case study, ethics approval was sought from both the University of Victoria and the Health Authority through the BC Ethics Harmonization Initiative for minimal risk studies. A copy of the Health Research Ethics Board approval is included in Appendix B. In order to recruit PHNs and PHN leaders for this study, and to obtain access to organizational documents regarding PHN practice and service levels, an Operational Review Application for a new research project was submitted to and approved by the Director of the Child Youth and Family program in the Health Authority, and forms a part of the final ethics approval.

### ***Confidentiality and privacy.***

All research data were kept on password protected electronic files on a shared drive located on a firewall protected server at the University of Victoria. Interviews were recorded on a digital recorder, and transcribed into word documents. All data were de-identified, and no identifying information was included in the interview transcripts. A list of participant codes was maintained in a protected and encrypted electronic file.

### **Part IV – Data Analysis**

In order to answer the research questions related to how PHN contact with priority perinatal women affected their rates of breastfeeding, infant immunizations, and household tobacco use, and how the organizational context affected the work of PHNs with these women, the quantitative and qualitative data were analyzed separately using analytic methods most appropriate for the type of data being used. Quantitative data were collected at the same time as

the qualitative data during the research process, but were not shared with participants.

Quantitative data relating to client outcomes collected on a routine basis contributes to an ever-growing database that could be used to make program decisions, however, appropriate analysis is required to ensure decisions are based on information that is both reliable and valid. There are a number of tools that I used to analyze this quantitative information.

### **Quantitative data analysis.**

Statistical analysis of the data provided by the BCCDC was done by means of the IBM Statistical Package for the Social Sciences (SPSS) version 24 software program, and using chi-square calculations to look for significant differences between the priority and non-priority groups of mothers and their children. This test was done to examine the proportion of breastfeeding at birth, 6 months, 12 months, and 18 months, levels of household tobacco use at 18 months, and infant immunizations completed by 18 months. Chi-square calculations and Phi measures of effect size were done for each of the three outcomes in each of the three local health areas, and as a combined total.

The chi-square statistical test is used for categorical data, such as breastfeeding or not, household tobacco or not, completed immunizations or not. In this project, data were categorized based on two independent variables: high priority, those mothers who received five or more postnatal encounters from a PHN; and low priority mothers, those with fewer than five PHN encounters. These were placed alongside the various outcomes of interest, or dependent variables, such as breastfeeding or not breastfeeding. For each outcome of interest, I wanted to determine whether the outcome was contingent on the level of priority. The chi-square test examines the proportion of cases that reside in each of the different categories, and provides a perspective on whether a difference in proportion is based on chance variations, or reflects a real

treatment effect (Polit & Beck, 2008). For this purpose, a contingency table was constructed for each outcome showing the frequency of each observation for each of the two independent variables. Table 4 shows an example of a contingency table for breastfeeding frequency at 18 months.

**Table 4**  
***Sample Contingency Table***

	Breastfeeding at 18 months	Not breastfeeding at 18 months
High priority (5 or more postnatal encounters)	32	309
Low priority (fewer than 5 postnatal encounters)	136	2208

In chi-square, the theoretically predicted or expected values are calculated based on the null hypothesis, which in this case would be that there is no difference in the outcomes between the priority and non-priority variables. For contingency tables, the expected frequency for each cell is achieved by multiplying together the column and row totals and dividing by the total sample size (Howell, 2008).

The chi-square calculation is the sum of the observed frequency minus the expected frequency, squared, and divided by the expected frequency  $\chi^2 = \sum(O-E)^2/E$ . The numerator measures how far the observed frequency differs from the expected frequency (Howell, 2008). The result of the chi-square calculation is then evaluated against an established table listing the sampling distribution of chi-square, along with the established degrees of freedom, which is defined as the number of categories minus one. In this case, for example, the two categories are breastfeeding or not breastfeeding, so the degrees of freedom equal one. When the level of significance or probability, known as  $\alpha$  or alpha, is established at .05 the table provides a figure

against which to compare the chi-square result. In this case, at 1 degree of freedom and  $\alpha = .05$  the figure used to compare with the chi-square result is 3.84 (Howell, 2008). This means that when the null hypothesis is true (there is no difference in breastfeeding between the priority and non-priority groups), only 5% of the time would we get a result greater than or equal to 3.84. If the chi-square result is .641, for example, it falls below the critical value of 3.84, so the null hypothesis is not rejected and one can conclude that there is no evidence to suggest that the effect of five or more PHN encounters influences the outcome.

In the chi-square calculations comparing priority and non-priority mothers, the expected outcome figure is derived mathematically. However, the research literature indicates that the rates of breastfeeding, and infant immunizations are expected to be lower, and tobacco use higher among the priority group compared to the general population. This is an important factor to remember when interpreting the results of the statistical analysis.

A statistically significant result does not always indicate practical significance (Howell, 2008). In addition to statistical significance, it was also important to consider the size of the effect being examined, which is a measure of the differences between the groups or independent variables (Howell, 2008). The phi coefficient is a measure of the size of relationships between two mutually exclusive variables. Phi is based on the chi-square statistic and yield values ranging between .0 and 1, often described as small, medium, or large (Polit & Beck, 2008). In this study, I looked for any relationship of practical significance between PHN contact and the achievement of the three outcomes by priority perinatal women in each local health area.

To assess the level of breastfeeding when the child was 18 months or older I compared the number of priority and non-priority mothers breastfeeding at birth with the number of priority and non-priority mothers with an indicator of breastfeeding at 18 months or more. If a record

documented breastfeeding at 18 months or any time after, the formula I used returned a positive indicator, which was then included in the count. Blank cells indicating a lack of PHN documentation were not incorporated into the calculations. Once entered into SPSS, this categorical data for each local health area was used for the statistical tests described above.

In a similar manner, I assessed the level of household tobacco use at 18 months, comparing the numbers of priority and non-priority mothers indicating household tobacco use at 18 months. In this situation, I used the total numbers of priority and non-priority mothers compared to the numbers indicating household tobacco use at 18 months or more. The approach was used based on literature suggesting that although women may quit smoking during pregnancy, they often resume smoking in the postpartum period (Flemming et al., 2013). In addition, in two of the local health areas involved in this study, the numbers of non-priority mothers reporting household tobacco use at 18 or more months was considerably larger than the numbers of non-priority mothers who reported household tobacco use at birth. Because people may start, quit, or resume smoking at any time, and because household tobacco use may not always be identified or reported by mothers, the effect of increased PHN involvement on the numbers at 18 months was more informative than comparing the change in tobacco with an uncertain baseline at birth.

In contrast to the statistical analysis of previous two outcomes, the calculation of completed childhood immunizations was based on the number of children, and not the number of mothers. In compiling the original data from BCCDC, I was able to identify and separate the children of priority and non-priority mothers, along with any related documentation. According to the BC provincial immunization program (BC Centre for Disease Control, 2016), children should have received a total of at least eleven vaccines at specified intervals by 18 months of age to complete the basic immunization series. I used an Excel formula to determine the total number of

vaccines for each child. Further sorting of this data enabled me to determine how many children had received at least eleven vaccines, providing a count of those who had completed their basic immunization series.

The statistical analysis of outcomes was done for the combined totals of the three local health areas as well as for each individual area. Detailed calculations for this process are included in Appendix H. This was done to provide an overall organizational view of the outcomes, and to demonstrate the range of results between areas given their unique geographic and population differences. Chi-square calculations were not done to compare differences between local health areas, because it was not the intention of this study to assess such individual differences, but rather to examine outcomes at the broader health authority level.

This detailed set of calculations, based on the administrative data provided by routine PHN client documentation, was done to compare the rates of breastfeeding, household tobacco use, and infant immunizations between priority and non-priority women across three local health areas. Because these two groups of women received differing amounts of PHN contact, the findings from this analysis respond to the initial research question regarding how additional and ongoing PHN contact with priority perinatal women was associated with the three outcomes of interest compared with those who did not receive the extra contact. The process of analysis for the second research question about how organizational factors affected the ability of PHNs to support women in achieving those outcomes is addressed in the next section.

### **Qualitative data analysis.**

The process of making sense out of collected qualitative data comprises a series of interconnected steps that form a spiral of activities (Creswell, 2013). This involves preparation and organization of data, reduction of data into themes by coding, consolidation and reduction of

the codes, and interpretation and presentation of the data (Creswell, 2013; Merriam, 1988).

Unlike quantitative analysis with its use of statistical tools, there are no established formulas that produce a final analysis of qualitative data in case study research (Yin, 2009). However, there are several tools that can assist in analysis by coding and categorizing data from interviews, documents, observations, and memos.

In this research project, I chose to use the computer-assisted qualitative data analysis software NVivo10. NVivo is a software application that supports qualitative and mixed methods research by organizing unstructured data such as interviews and documents, and provides tools to assist in tracking patterns and themes identified in the data (QRS International, n.d.). NVivo10 also provides an audit trail, which includes raw data, field notes, data reduction and analysis, process notes, and personal notes such as motivations and rationale for various decisions taken in the process of collecting data. Nevertheless, the development of codes, the assignment of data to codes, and the final analysis of data comes from my own interpretation of the patterns and themes that I identified.

The intent of the qualitative component of this mixed methods research project, was to seek information and evidence from PHN interviews, organizational documents, and my own participant observations reflecting patterns or themes that would help to answer the research questions, and provide context for the quantitative findings from administrative data. As well, I looked to the theory of critical caring (Falk-Rafael, 2005; Falk-Rafael & Betker, 2012a) as a framework that guides the work of PHNs, and which guided my analysis of themes. Although there are several analytic techniques recommended for case studies (Yin, 2009), I chose to use thematic analysis to look for patterns of meaning about the work that PHNs do with priority perinatal women, and the organizational influences that might affect that work.

### ***Thematic analysis.***

Thematic analysis is a means of recognizing, examining, and documenting themes or specific patterns of meaning found across an entire data set (Braun & Clarke, 2006; Joffe, 2012). Originally established by Gerald Holton, thematic analysis was developed to inductively identify implicit or tacit themes in data (Merton, 1975). Although it is rooted in the tradition of content analysis, thematic analysis has less of a focus on the frequency of codes, and more interest in the implicit meanings of codes (Joffe, 2012). Thematic analysis is not based on any particular philosophical perspective and therefore can be used with a range of philosophical views (Braun & Clarke, 2006). By examining the experiences, meanings, and reality of participants, thematic analysis fits well with critical realism (Braun & Clarke, 2006; Joffe, 2012). In this case, the perspective of PHNs produced themes related to underlying mechanisms, which influenced their ability to support priority perinatal women. Interview data and organizational documents, as well as participant observations were all well suited to thematic analysis (Joffe, 2012). Thematic analysis works well to both reflect reality, and dig deeper to look for underlying meaning (Braun & Clarke, 2006).

Although there are various approaches to thematic analysis, the style I chose was more of a theoretical approach in which I coded for the specific research questions, Falk-Rafael's (2005) critical caring theory of PHN practice, and the literature related to the topic area. This required flexibility to develop codes that captured important elements related to all of these rather than simply coding based on the interview questions (Braun & Clarke, 2006). After becoming familiar with the data corpus, the next step in the process was to look for issues of interest across the entire data set, as well as the analytic memos created during the process, moving back and forth recursively across the data to capture relevant ideas and thoughts to generate some initial

codes (Braun & Clarke, 2006). Many codes are initially developed, but later were grouped together into potential themes. The software NVivo10 aided the process by maintaining a list of the codes, their definitions, and the segments of data that were assigned to each code. As the process unfolded, new and more refined codes were added to the coding framework (Joffe, 2012). In this research project, I started to code the data with the constant comparative approach, which is a foundational element of grounded theory (Glaser & Strauss, 1967/1999; Wuest, 2012).

### ***Coding.***

Coding involves labeling parts of the data to sort and organize it. A code in qualitative inquiry is usually a word or phrase that captures the essence of language-based or visual data, such as interview transcripts, documents, photographs, or field notes (Saldana, 2013). Codes are labels that give symbolic meaning to the information or data collected in a study (Miles, Huberman, & Saldana, 2014). Such codes help to distill, condense, or summarize data, and facilitate the detection of patterns, assist in categorization and other analytical processes (Saldana, 2013). The process of coding itself is part of the analysis, and allows researchers to categorize, retrieve, and cluster similar elements of data for further analysis (Miles, Huberman, & Saldana, 2014), although Saldana (2013) also sees coding as a transitional process between the collection of data and a more rigorous analysis.

Throughout the data collection and analysis process, codes are developed and revised as needed. It is recognized that the process of coding is filtered through the eyes of the researcher, as is the choice of questions asked in interviews, along with the types of responses received (Kvale & Brinkmann, 2009; Saldana, 2013). There are numerous approaches to coding based on different research purposes. Saldana (2013) outlines over two dozen first cycle coding methods along with six-second cycle coding methods. Several different coding methods can be used at

the same time (Saldana, 2013). Coding is a cyclical process usually requiring several cycles of coding to further highlight, filter, and manage data to generate themes, concepts, and categories (Saldana, 2013). Codes can have sub codes that further define and clarify a concept, and later codes can be combined to form similar groupings or categories (Saldana, 2013). Recoding may also be necessary to further refine codes after additional reflection on patterns that may emerge over time.

I developed initial codes based on the two research questions as well as Falk-Rafael's (2005) critical caring theory, and the PHN intervention levels as described by Olson-Keller et al. (2004). Further codes were developed as I worked through the interview transcripts, the guiding documents, and my analytic memos. Through a second round of coding, this process provided an opportunity to consider emerging codes as they related to subsequent interviews and ongoing analytic memos.

### *Analytic memos.*

Analytic memos provide an additional way to keep track of changes to codes throughout the research process, as well as a way to document and reflect on progress, adjustments, and emerging ideas and concepts (Saldana, 2013). The use of analytic memoing is a quick tool that captures the researcher's thoughts, ideas, and reflections about the data collection process, and often ties together different components of data to assist in analysis (Miles, Huberman, & Saldana, 2014). These memos were done through NVivo10, and made available for later consideration. Some see coding and analytic memo writing as concurrent analytic activities (Saldana, 2013; Weston et al., 2001). Memos can also reflect personal musings, providing an opportunity to keep track of hunches, intuition, and serendipitous occurrences that may lead to richer explanations (Janesick, 2011). In addition, they provided an opportunity to examine my

own reactions to the data through the process of reflexivity. These dated memos became part of the accumulated data, and were also coded and analyzed.

### ***Tracking the research process.***

With such a volume of data to review, there were several strategies I used to check the progress of analysis. These strategies included initiating the coding process while transcribing interviews, and maintaining a reflective journal throughout the research project (Ezzy, 2002). A data accounting log was used to track date, site, source, and type of data (Miles, Huberman, & Saldana, 2014).

A contact summary form was a useful way of recording who was involved in particular visits, and what the main issues were. I kept a record of all participants, including when they were interviewed, tracking numbers, and the type of interview encounter – in person or by phone. After each interview, I made field notes regarding my thoughts about the interview process, participant engagement, and other ideas that came to mind during the interview process. This information was coded and analyzed, and provided an opportunity to review the main issues or themes that become immediately apparent following an interview (Miles, Huberman, & Saldana, 2014). I used these strategies as I worked through the data collection and analysis process for three separate sites within one organization.

### ***Analytic strategies.***

Yin (2009) describes a number of analytic strategies that are effective for use in case studies. Pattern matching is an approach suggested by Yin, where observed patterns are compared to expected ones. In my project, based on the literature reviewed along with Falk-Rafael's (2005) critical caring theory, I expected that PHN contact with priority perinatal women would make a positive difference in outcomes related to breastfeeding duration, infant immunization, and

household tobacco use. I also expected that PHNs made a difference with this population when organizational supports were in place. Yin suggests that such expectations are described as propositions that reflect the research questions. In this project, I looked for data from interviews and documents that matched or supported the overall pattern of PHN effectiveness. At the same time, I looked to see if alternative patterns were found in the hope of supporting causal inferences. I examined these patterns in each of the three health unit sites to look for similarities or differences. Yin also recommends that it is important to identify certain threats to the validity of this approach, such as rival explanations to see if there are any other possible explanations for the findings, and to show how they cannot be supported based on the actual case study findings.

Another general analytic strategy offered by Yin (2009), which is of particular use for explanatory case studies, is that of explanation building. The intent with this approach is to analyze data from the case study by developing an explanation about the case (Yin, 2009). In this study of PHN effectiveness with priority perinatal women, the goal was to seek explanations about why PHNs are effective or not, and to look for reasons or underlying mechanisms related to how and why their work made a difference based on the theoretical concepts of critical caring (Falk-Rafael, 2005) and the levels of PHN intervention (Olson-Keller et al., 2004). Although Yin suggests other strategies, I felt that these were the most appropriate for my investigation.

## **Summary**

The intention of this chapter was to discuss the methodological details of this mixed methods case study inquiry. A case study design provided the opportunity to examine the real-life context of a situation, relying on multiple sources of evidence (Yin, 2009). It offered an appropriate approach to explore both the specific outcomes of interest that PHNs hoped their priority perinatal clients would achieve, and the various organizational factors that influenced the

ability of PHNs to support this population in achieving those goals. As a research design, case study has a philosophical foundation congruent with that of critical realism. Both quantitative and qualitative data collection and analysis methods fit well within a case study methodology, if quality is maintained. Other research methodologies may also have been appropriate to investigate the effect that PHNs had in supporting priority perinatal women, however case study is one that provided an opportunity for an in-depth description and analysis of the day-to-day circumstances in which PHNs practice in relation to the outcomes they hoped to achieve with priority perinatal women.

## **Chapter 6 - Findings**

This case study utilized both quantitative and qualitative data collection methods to examine the effect of additional and ongoing PHN time with priority mothers on three outcomes of interest. The analysis of the qualitative interviews with PHNs along with the policy documents are linked with the statistical results of administrative data comparing outcomes between two groups of mothers. This approach to analysis is based on Sandelowski's (2014) method of linking qualitative and quantitative findings, placing them in juxtaposition to one another to help explain the results. In this case, I used the interview and other qualitative data to elucidate the results of the statistical tests. Findings from the analysis of administrative data based on PHN documentation are discussed first, followed by findings from the thematic analysis of interviews, and guiding documents. The quantitative findings relate directly to the initial research question regarding the three outcomes of interest, and the qualitative findings provide background and context to those outcomes by exploring the organizational factors that affect the work that PHNs do with priority perinatal women.

### **Quantitative Results**

Data collected to determine the impact of additional PHN support came directly from routine, day-to-day client documentation done by PHNs in iPHIS, as nurses provided service to both priority and non-priority mothers. Three different geographic areas within one health authority were examined, as each provided a slightly different set of circumstances in which PHNs delivered service. Each area had different local leadership, different population sizes, and different mixes of urban and rural population. However, all three areas operated under the same organizational policies. Initially I discuss the findings as they relate to the combined totals for

the three local health areas. I then examine results for each area, before discussing the similarities and differences between them.

### **Breastfeeding.**

Because breastfeeding is initiated at birth, a baseline count of how many mothers started breastfeeding in each of the priority and non-priority groups was established. Calculations of breastfeeding frequency at various later intervals were done based on these original figures. It was interesting to note that across the three areas 95% of priority mothers initiated breastfeeding at birth while only 50% of non-priority mothers started breastfeeding. Chi-square tests indicated a significant relationship between the priority group and breastfeeding initiation,  $\chi^2(1, N = 2685) = 239.78, p < .05$ . Phi = .299 – a medium effect size. In this case, the observed count of priority mothers exceeded the expected count.

Initially I planned to examine only breastfeeding frequencies at 18 or more months of age, however in looking at the data I found less evidence of any kind of infant feeding documented by PHNs as time progressed. For that reason, in addition to the 18-month frequency, I decided to examine breastfeeding frequencies at six or more months, and at twelve or more months. Data on breastfeeding at these points came from the child's records only, and included any indication of breastfeeding. The six and twelve-month time frames coincide with the routine childhood immunization schedule, and I thought they would provide more information about the successful establishment of breastfeeding. The World Health Organization recommends that exclusive breastfeeding for the first six months is the optimal method of infant feeding (Feig, 2011). Although PHN documentation in iPHIS does not indicate whether breastfeeding is exclusive or not, it does reflect the presence or absence of any level of breastfeeding.

At 6 months postpartum, Chi-square results for breastfeeding across the three local health areas showed a significant difference between the priority group and the non-priority group, however, this time the observed count of priority women breastfeeding was lower than the expected count,  $\chi^2(1, N = 1516) = 58.62, p < .05$ . Phi = .19 - a small effect size. Nevertheless, 49.8% of priority mothers who initiated breastfeeding were still breastfeeding at 6 months postpartum. As discussed earlier in the literature review, breastfeeding rates among the priority group are expected to be lower than the general population. Young mothers, those from low-income groups, and those with less education are less likely to initiate breastfeeding, or to continue for the optimal length of time to get the greatest health benefit (Ahluwalia et al., 2005; Bolling et al., 2007; Eidelman & Schanler, 2012). If the initiation rate of breastfeeding is high among the group of priority mothers, and if almost 50% were still breastfeeding at six months, then this is a positive finding.

At 12 months postpartum, there was no significant difference in proportion between the priority and non-priority groups of mothers who were still breastfeeding,  $\chi^2(1, N = 1516) = 2.96, p > .05$ . Phi = .044 - a small effect size. By this time 24.6 percent of priority mothers were still breastfeeding their children, compared to 29.5 percent of non-priority mothers. This is a positive finding considering that the underlying expectation is that fewer priority women than non-priority women would still be breastfeeding one year after the birth of their child.

Breastfeeding at 18 months was chosen as a primary indicator for this study based on the World Health Organization's recommendation for continued breastfeeding, along with complementary foods, up to two years of age or beyond (Feig, 2011). Using the figures available from routine PHN documentation, Chi-square results show no significant relationship between priority level and breastfeeding at 18 months or more,  $\chi^2(1, N = 1516) = .641, p > .05$ .

Phi = .02 - a small effect size. In this case, the proportion of breastfeeding in the priority group is similar to that of the non-priority group, with 9.8% of the priority mothers compared to 11.4% of the non-priority mothers. This is also a promising finding because, based on the literature, the priority group was expected to have lower frequencies of breastfeeding over time.

A breakdown of the figures for each local health area shows some interesting differences between the areas. Although all three local health areas had very high rates of breastfeeding initiation at birth, by 6 months the proportions of priority mothers breastfeeding ranged from a high of 58% in one area to a low of 40% in another area. In two of the areas there was a significant relationship between breastfeeding frequency and the level of PHN contact, however in both these areas the observed count of priority mothers breastfeeding was lower than the expected count. In two of the health areas, breastfeeding among the non-priority group of mothers remained very high at 95 to 100%, while in the third area it had dropped to 48%. The lowest proportion of priority mothers breastfeeding and the lowest proportion of non-priority mothers both came from the same local health area.

At 12 months postpartum, breastfeeding frequencies had further declined in all three areas with a range of 32.2% to 26.8%. In two of these areas there was no significant difference between the priority and the non-priority populations, which means that the proportions of priority mothers still breastfeeding was similar to the proportion of non-priority mothers still breastfeeding at 12 months. In the remaining area, there was a significant difference between the priority and non-priority mothers with a lower observed count than expected count in the priority group. In each area Phi, the effect size, was small.

By 18 months postpartum breastfeeding frequencies had dropped even further, ranging from 16.2% to 2.9%. In only one area was there a significant difference in the proportion of priority

mothers to non-priority mothers breastfeeding, and as with earlier findings, this reflected a lower observed count of priority mothers breastfeeding at 18 months than the expected count. In each area there was only a weak effect size as determined by Phi measures. In contrast to the priority population of mothers, the proportion of non-priority mothers still breastfeeding at 18 months ranged from 27.5% to 5.8%. Further analysis of the qualitative data may help in understanding some of the factors influencing these differences in different areas.

### **Household tobacco.**

Data regarding household tobacco use was elicited based on enquiries of the family at each childhood immunization clinic visit. Within this health authority it was an established practice to inquire whether there was a smoker in the child's household. These data were collected from iPHIS in a specialized documentation field on the early childhood record identified as *local study*. The phrasing of the question was modified over time from "do you smoke?" to "is the child exposed to second hand smoke?" and later to "is there a smoker in the household?". These modifications were made because of anecdotal PHN feedback that the earlier questions may not have elicited an accurate response. The data collected in iPHIS clearly reflected a range of responses. In reviewing the raw data, I found that the consistency of documentation at each contact was poor, in that there were many instances where there was no documentation relating to household tobacco use. Most of the documentation reflected the presence of tobacco use, and not the absence of tobacco. Although the question was intended to be posed at each clinic visit, there were fewer and fewer documented entries as children grew older. Interview comments from some PHNs reflected their discomfort in repeatedly asking the same question at each contact. It should be noted that in the raw administrative data, where there was no indicator of

household tobacco use, the assumption was made that there was none. This may not be reflective of true rates, and thus these statistical outcomes need to be considered in that light.

Based on these data there was a significant difference in household tobacco use between the priority and non-priority groups,  $\chi^2(1, N = 2685) = 39.44, p < .05$ . Phi = -.121 - a small effect size. The presence of household tobacco use was noted in 31.1% of the priority group, and 16.9% of the non-priority group. Given that the priority group is expected to have higher rates of tobacco use than the general population this is not a surprising finding.

Across the three different local health areas there were differences in proportions of household tobacco use among the priority groups ranging from 60.5% to 2.8%. Interestingly, in the area with the largest overall population there was a total of 41 positively assessed for household tobacco use out of 1244 mothers, while in a much smaller geographic area there were 243 indicators of tobacco use out of 490 mothers. These figures leave me wondering about the consistency of tobacco use assessment by PHNs, and the related documentation. Further discussion following the analysis of PHN interview data may offer some insights into the quality of these data.

### **Infant immunizations.**

Documentation of infant immunizations was considerably more consistent than household tobacco use because documentation of immunizations is a legal requirement. Across the three local health areas there was no significant difference between the priority and non-priority groups of children,  $\chi^2(1, N = 2785) = 2.684, p > .05$ . Phi = .031 - a small effect size. The lack of a significant difference means that the proportion of immunized children are similar in each group. In this case 80.8% of priority children were fully immunized with at least 11 vaccines by the age of 18 months or more, which is even higher than the non-priority group of children at

77%. This is a very positive finding given that children of priority families are not expected to be immunized at the same rate as non-priority children.

Across the three local health areas, percentages of immunized priority children ranged from 86.6% to 67.4%. In two of the local health areas there was no significant difference in the proportion of immunizations between the priority and non-priority groups of children. However, in the third area there was a significantly higher proportion of priority children at 86.1 percent immunized, compared to 70.4 percent of non-priority children,  $\chi^2(1, N = 992) = 13.59, p < .05$ . Phi = .117 - a small effect size. Once again this is an unexpected finding given that the priority group of mothers were expected to have lower rates of immunizations for their children.

**Summary of quantitative data findings.**

Administrative data, based on PHN documentation, was used in this study to assess three outcomes of interest. Table 5 shows the summary results for the three local health areas combined.

**Table 5**  
*Summary results for three local health areas combined.*

Outcomes of Interest	Priority Families	Non-Priority Families
	(N=341 mothers N=355 children)	(N=2344 mothers N=2430 children)
<b>Mothers breastfeeding at birth</b> (based on total population)	95.3%	50.8%
<b>Breastfeeding at 6 months</b> (based on numbers breastfeeding at birth)	(N=162) 49.8%	(N=1191) 72.3%
<b>Breastfeeding at 12 months</b> (based on numbers breastfeeding at birth)	24.6%	29.5%
<b>Breastfeeding at 18 months</b> (based on numbers breastfeeding at birth)	9.8%	11.4%
<b>Children exposed to household tobacco use by 18 or more months</b>	31.1%	16.9%
<b>Children with completed immunizations at 18 or more months</b>	80.8%	77%

Breastfeeding, household tobacco use, and infant immunizations are key areas of focus for PHNs in providing services to all new mothers. Chi-square tests were used to determine whether there was a relationship between the priority level and the individual outcomes of interest. It was not the intention of this study to compare one local health area with the others, given differences in staffing levels, population figures, and geography, but looking at the range of outcomes in the three areas does provide some additional understanding. A closer examination of the effect of PHN involvement on the three outcomes of interest has provided insight about the positive effect of additional and ongoing PHN engagement with priority mothers. Not only are more priority mothers initiating breastfeeding, but at 12 and 18 months priority mothers are still breastfeeding in the same proportion as non-priority mothers despite expectations to the contrary. With regard to household tobacco use, although there are concerns about data collection consistency, the proportion of priority mothers indicating the presence of household tobacco use was higher than that of the non-priority group. Lastly, children of priority families were immunized in the same proportion as that of non-priority families. The provision of additional and ongoing PHN engagement with priority women suggests a positive effect on breastfeeding duration, and infant immunizations. Findings from the thematic analysis of PHN interviews and guiding policy documents help to provide further information about the context and underlying mechanisms influencing the ability of PHNs to work effectively with the priority population of new mothers.

### **Qualitative Results**

The statistical analysis of the three outcomes of interest was the first step in responding to the initial research question regarding differences associated with additional and ongoing PHN contact with priority perinatal women. The exploration of PHN perspectives provided an opportunity to consider the second research question concerning organizational factors that affect

the ability of PHNs to support these women. Analysis of the qualitative data was done prior to completion of the quantitative statistical analysis, so as to minimize bias in the search for themes. With these two research questions in mind, I discuss the themes that I have identified from the various interviews, and documents that provide insight into the organizational factors that affect the work that PHNs do with priority perinatal women. I also link those themes to the various curative health-promoting processes identified by Falk-Rafael (2005) in the critical caring theory, which serves as a framework to guide PHN practice. To protect the privacy of PHN participants whose comments are included in the next section, all quotes have been assigned a random selection of fictitious names. Prior to discussing findings from the qualitative data, however, it is important to understand the process involved in the development of codes, and the identification of themes.

### **Analysis of themes.**

I used the process of thematic analysis to review encoded information gleaned from PHN interviews, guiding documents, and my own research journal, field notes, and analytic memos. I looked for themes that reflected aspects of the health care organization that had a bearing on the ability of PHNs to work with priority perinatal women to improve breastfeeding, tobacco reduction, and immunization outcomes at the individual, community, and systems levels. I also looked for ideas and views that validated the various curative health-promoting processes of Falk-Rafael's critical caring theory. Although some themes became apparent quite quickly due to the frequency of mention by PHNs, other patterns emerged based on concepts that suggested possible underlying mechanisms behind various organizational factors. As each new theme became apparent, I examined it for plausibility, I looked for data that might refute it, and I looked for evidence of similar patterns elsewhere in the data (Miles, Huberman, & Saldana,

2014). Three groupings of themes emerged: relationships, organizational attributes, and PHN attributes. In the sections that follow, I examine each group of themes identified, and explore the links to the other themes and theoretical elements, as they play a role in a larger complex network of organizational influences on PHN practice with priority perinatal women.

### ***Relationships.***

The first theme that I identified surfaced early in the interview process when every one of the sixteen participants mentioned the importance of establishing a trusting relationship. Many of the PHNs referred to the development of a trusting relationship between themselves and individual priority perinatal women, but there was also recognition of the importance of a relationship a mother might have with others in the health unit office, and to other community supports, as well as the relationships between health care providers and their organization when delivering service to priority perinatal women. Relationships at all ecological levels, from individuals to communities to systems, are recognized by Falk-Rafael (2005) in her critical caring theory, as an important carative health-promoting process. “Developing trust was considered essential to beginning and maintaining a relationship; respect, authenticity, an open, nonjudgmental attitude, and integrity were seen as pivotal to developing and maintain that trust” (Falk-Rafael & Betker, 2012a, p.322). This is reinforced by the Canadian Community Health Nursing Standards of Practice, standard number four, which identifies the importance of professional relationships at the individual, family, community, and population levels (Community Health Nurses of Canada, 2011).

PHN participants in this study gave many examples of the value of trusting relationships at various levels. One PHN participant, Alex, spoke about the difference she thought PHNs made with priority perinatal women by saying:

I think we make a really big difference in that for some women that's the first time they trust somebody. They've had a lot of bad experiences and you have to work fairly hard, usually, to gain that trust. But once they do have that trust, they've got a place that they can go when they've got questions, when they've got fears, when they've got concerns or when they're in really big trouble. And so, I think it makes a big difference.

Yet another PHN participant, Sam, described the importance of establishing a relationship with new mothers this way:

I think it's the personal contact and the client-nurse relationship that makes a huge difference in this. I think that makes the huge difference, the building of that relationship, the level of trust that comes with a good solid nurse-client relationship, so that those people feel comfortable coming to the health unit, feel comfortable and trust that the information we're going to give them is solid, and in their best interest. Um, they feel safe coming to us. I think that's the key, is building that relationship.

When asked if she felt that the establishment of a trusting relationship with priority perinatal mothers made a difference to breastfeeding success, Terry compared past practice to recent changes by saying:

Oh yes, definitely. And the more you are involved in their lives, ... but the more you were involved, there's a direct correlation. Like now I'm watching how we've changed practice over the last couple of years of not seeing moms so much, and our breastfeeding rates are in the toilet.

Although Terry felt that a trusting relationship was important to successful outcomes, her comment also highlighted the impact of recent system changes affecting the level of PHN

involvement with individuals and with communities. With less involvement, there is less of an opportunity to establish and maintain trusting relationships with those who need more support.

The development of relationships at the community level was identified by several PHNs as being essential to achieving success with breastfeeding, immunizations, and tobacco on a broader scale. Les reflected on a nurse who had worked in a First Nations community and who managed to shift the local culture of breastfeeding:

...and when she started working there, there was no breastfeeding that was occurring in the young population because young populations – teens, early twenty-year-old women, and we know that breastfeeding is protective in a lot of ways – from diabetes etc. So, she worked with individual families, would go to their homes, worked with the elders, and had education sessions and did support for the young moms who were breastfeeding. So brought the elders in - because sometimes they were blocked in terms of their breastfeeding – so they were there to support the women. So, by the time she (the PHN) left at five years almost all of the women there were breastfeeding.

As well as providing an illustration of the value of trusting relationships at the community level, this example also reflects Falk-Rafael's (2005) curative health promoting processes of honoring belief systems and cultural practices of communities, as well as using a systematic and reflexive approach with individuals, families, and communities.

Taylor described her approach to supporting immunizations through the development of relationships with the staff involved in a local pregnancy outreach program for priority perinatal women:

I felt that it was really important for me to build relationships with the staff because they were the ones that were actually giving a lot of the information. So, building

relationships with the social workers and with the doulas or whatever, they were sometimes, from an immunization perspective, they might have been totally against immunization.... And they were the ones who were really influencing the mothers' choices. So, it was building respectful relationships, not just directly with the mothers, but with the staff, the people who were answering questions whether it was about breastfeeding or tobacco – tobacco reduction, that... I know it's a really important topic, but that didn't seem to be a controversial one, but certainly with regards to immunizations and breastfeeding, it was really important to have some more expert advice in there.

This PHN explained how developing relationships with other care providers at the community level helped to improve immunization rates for the priority population of new mothers over time by educating others who provided service to this same group. In addition to the carative health-promoting process of developing and maintaining trusting relationships (Falk-Rafael, 2005), this example also reflects two other carative processes, that of teaching and learning, as well as building community capacity. Not only do good relationships facilitate effective teaching and learning, but the resulting improved level of understanding among community partners helps makes a positive difference in building community capacity. Kelly summed up the importance of relationships over time in a smaller community, when she said:

You know families, and you know relatives, and so it's sort of the trust that builds just goes on to the next generation. You know, I'm visiting moms now that I visited when they were babies. I have found that once a trusting relationship is in place, the PHN continues to be a person of influence whom clients will consult as issues arise for them

through the life cycle of subsequent pregnancies, infancy, childhood, adolescence and beyond.

Kelly's words also highlight the theme of time relative to the idea of relationships, and how it takes time and continuity to develop and establish trusting relationships.

*Time and continuity.*

Relationship development takes time not only with individuals and families, but also with communities, and at the systems level with work colleagues and organizational leadership. PHNs interviewed talked about time in relation to having the time in their work schedule to connect with people, but also in relation to the continuity of connections and support over long periods of time. PHN participants acknowledged the importance of support from administration to take the time within a busy work day to develop and maintain relationships. Jamie described it this way:

I think being available, being approachable, being non-judgmental – these are all very intangible things –having really good communication skills. But, I think something that is perhaps a little bit more tangible and measureable is that the nurses have the time to go and build that relationship and maintain that relationship and invest (in) that relationship. Having the time to build and maintain relationships in the face of many other work demands can be a challenge. This PHN appreciated the fact that she was allowed the time to do this important piece of work, and that she had the flexibility within her work schedule to be available and to take the time to connect with new mothers who needed additional and ongoing support.

Time within a work schedule on a day-to-day basis is one aspect, but having that opportunity on an ongoing basis over years is another. For PHNs new to a community, this can be a challenge. Sasha acknowledged that it often takes months or years to establish

relationships. She said “whereas before I didn’t have people coming in as regularly and I didn’t have these ongoing relationships. It takes a year or so in the community before that really gets going.” Chris also pointed out the effect of time when she said:

It’s true that once you have a relationship with the people there and they see what a difference one issue makes and you go on to the next one and people just kind of get on board faster and faster. It (takes) years. Like you have to build those relationships and develop that common vision, and be able to be flexible with our resources to make that happen.

Falk-Rafael and Betker (2012a) also identified time as being a factor in establishing relationships, noting that “trust developed gradually over time by meeting the immediate needs of people”, and that with individuals “establishing trust could be a long, slow process” (p. 322). Time is an important consideration for establishing relationships at all ecological levels, not only with individual priority mothers, but also with community members, work colleagues, and organizational management.

Health care organizations, in which PHNs are employed, have a strong influence on the amount of time PHNs have available to work with individuals and communities, and this in turn also affects the continuity of ongoing services. Kim expressed concern about recent program changes that limited face-to-face encounters with perinatal women, and the effect of not having the time to establish relationships with new mothers:

...that’s one of the concerns when we’re making phone calls is that they don’t know you from a hole in the ground, and so you phone and you say who you are, but if they’ve heard things about PHNs, or they haven’t heard things about PHNs, you’re just this

person picking up the phone. I think they need the face-to-face to feel that they trust you and are comfortable with you.

Although this comment refers more generally to all new mothers, it does reflect on the initial encounters a PHN has with any new mother, even before determining whether she needs additional and ongoing support for issues such as postpartum depression or family violence.

When health care organizations initiate changes in service delivery, these systems level changes can have unexpected positive or negative influences on outcomes over time.

Francis recognized the value of continuity when she explained how a change to the established system of follow-up for PHNs allowed nurses to maintain contact with families that moved frequently within the community.

One of the things from a priority client perspective was when we moved from district nursing that was maybe, yea, that was a significant change because that helped us to be, show respect for the parents because a lot of these priority clients they moved between areas.... We were working initially as district nurses and then when we stopped working as district nurses and we just respected that people moved from area to area and we needed to provide them with continuity, that was something that was important.

In this situation, the organizational change from district nursing, in which PHNs provided service within a defined geographical area, to a broader approach where district boundaries no longer restricted their visiting, allowed nurses to continue following priority families with whom they had established relationships. Such a change provided for better continuity of service, and maintenance of relationships over time.

Dana summarized the significance of time and continuity on relationship development at the community level by saying:

Consistency of staffing, because if people... it's in a community, and in smaller communities people get known. So just flipping people from unit to unit, not a good idea, not in public health. Knowledge of a community, valuing of staff who have been there for a long time and know or live in the community. Relationship development with families, schools, and the neighborhood houses, social workers, etc.

These comments reflect concerns about continuity of staffing, which may also be affected by changing program priorities, staffing levels, or individual work assignments. Such organizational changes may, in turn, affect the amount of time available for PHNs to establish relationships with individuals, communities, and systems. Similar comments by PHNs reflect how changes to long standing community programs offered by PHNs can also disrupt the continuity of services and the relationships that have been established, affecting outcomes over the long term.

***Organizational attributes.***

To offer additional and ongoing support to priority perinatal women, PHNs offering that service need organizational support to help them work effectively towards the desired outcomes, and to recognize those successes. Organizational supports are manifest in a variety of ways including in such things as practice guidelines, documentation protocols, educational opportunities, and staffing levels. Organizational supports also include facilitating an engaging workplace, which involves consideration of workloads, control over work, recognition, a sense of community, and fairness (Freeney & Tiernan, 2009). Analysis of guiding documents and interviews with PHN participants highlighted a number of aspects of organizational support. From these I identified several themes that seemed to affect the work of PHNs offering services

to priority perinatal women. These include supports for PHNs, the workplace culture and environment, documentation, and shifting priorities.

*PHN supports.*

Organizational support and direction for PHN practice with priority perinatal women was illustrated in a variety of ways from formal provincial and health authority sponsored directives and educational events to informal discussions and consultations with peers. Support in the form of clear direction was evident in several of the guiding documents that were reviewed for this study. The BC provincial Model Core Program on Reproductive Health (2009) provided guidance and direction for PHNs, aimed at identifying maternal risk factors by building trust, and by providing home visits or group sessions to offer education and counselling for low income and vulnerable women. The Perinatal Services BC website (Perinatal Services BC, 2011) has a suite of forms and documents providing direction about a range of perinatal issues, including a nursing priority screening tool, breastfeeding guidelines, and tobacco use guidelines for both hospital and community-based nursing care. The health authority, in which this study took place, also provided detailed practice guidelines for priority populations of women and their families (Hill, 2010a, 2010b). These health authority and provincial practice guidelines were electronically available to every PHN during this period, however, when asked what they turned to for guidance in relation to priority perinatal clients, most PHNs interviewed indicated that they usually went to their colleagues for advice and direction before consulting official guiding documents.

Such support from workmates was identified as being central in the early stages of learning about the new role of PHNs, as well as for experienced nurses when dealing with difficult or unusual situations with families. This kind of collegial support was mentioned by PHN

participants more often than formalized organizational support from management. When asked about guidance and support for their nursing practice with priority perinatal women, several participants identified their PHN colleagues as being their primary source. Alex put it this way:

Well a lot of it would be talking to my peers, you know, or my mentors. The women that – like I had a very experienced group of amazing nurses when I started, so I had a lot of support and guidance from them. Um, I, you know... very rarely, I don't think I ever really talked to my supervisor much about, you know, unless you had to, you had somebody that you thought was going to end up in court.

This comment reflects the degree of respect that other PHN colleagues were given regarding their overall level of knowledge and experience, suggesting that nurses would turn to their colleagues first for trusted advice. When asked where she would go for support for a priority family, Kelly also indicated that work colleagues were her primary source of support:

Usually I go to my teammates first. Like I'll go to \_\_\_\_\_ or to \_\_\_\_\_, but especially to \_\_\_\_\_. She has a lot of experience with this type of population. I'll also go and connect with the other people that I'm working with on this family. The family support worker or some of the workers at the family resource centre, or I'll connect with a physician. And if it's a much more nursing related nursing issue I'll go to my clinical coordinator.

Turning to other PHNs was mentioned by several study participants as a way to deal with challenging situations. Sam spoke about how she would deal with a difficult family situation:

The first thing I would do is find a public health nurse colleague to talk to about the situation. I guess the, for me, probably it's for all public health nurses, but you know, visiting a mom in a home, and I leave there feeling concerned maybe about her ability to parent, or the safety of the house – those would be two things that would leave you not

sleeping at night. So, I would talk to a public health nurse about that, and debrief about that.

Although managers and supervisors were often viewed as supportive, several participants referred to their PHN colleagues as being their primary source of information in their orientation to public health nursing. Jamie described her transition into public health and working with priority perinatal women this way:

I kinda felt a little bit thrown into it because, you know, I was told well, I was asked if I'd be willing to be on that team, and I said yes, but I don't know what I'm doing, and umm, so I think I got some guidance from the other nurses who were doing it, but I also felt like I was flying a bit by the seat of my pants and I was also using my past experience in life because I've had kids and I worked in the acute part of perinatal spheres, and I used to be a la Leche League leader.

Jamie went on to say:

I learned probably the most from my peers, and talking through situations, and sort of saying well this is what I did, but I'm not sure, you know, should I have done something different, or more, or whatever, and that sort of was probably the best guidance.

These comments about turning to other PHNs and work colleagues for support suggest that trusting relationships are vital, further strengthening the link to Falk-Rafael's (2005) critical caring theory, and demonstrating the merit of relationships at community and systems levels as well as at individual levels. Such comments also reflect the importance of friendly and reciprocal support among PHN colleagues, who often work independently with families and communities, and who many need guidance when supervisors are not available, or when dealing with situations not addressed by policy manuals or other guiding documents.

Recognition of this kind of support by organizations may vary over time and in different circumstances. In discussing some of her challenging experiences with priority perinatal mothers, Val reflected on the nature of support she experienced from the health authority by saying:

We'd have meetings, and we'd talk about how to handle certain situations so like, have you seen so and so lately? I wonder how she's doing. But we sort of just found them on our own, and we just kind of followed up however we wanted really.

She added that “there really wasn't any communication other than if we chose to talk and debrief with our colleagues about what we were doing. We just sort of did whatever we thought we should do at that time.” Although such staff meetings may not have provided clear direction about how to manage challenging situations with clients, the opportunity to discuss them with other PHNs was made available by the organization.

Others identified good support from the organization when it came to education for staff. Cameron spoke specifically about the support from the health authority around breastfeeding, and its far reaching impact:

There was a move where, as a health authority, there was efforts to increase the education of all the PHNs around breastfeeding... But you know, and that's a fair expense to educate all the front-line staff that we did. And coming out of that what I saw, you know, not long after that or around the same time, was a number of nurses who were keenly, keenly interested in the breastfeeding, going on to do their LCs (Lactation Consultant certification) on their own, and although they were not funded you know, by the health authority to do that, there was a lot of encouragement at that time for people to do that and come back and use that knowledge, so using it in parental classes, and to use it in the

breastfeeding clinics, and to use it to help support the other nurses in their practice. So, I think that was a huge piece, and unfortunately over the time, that has really fallen off and fallen back to being more of the responsibility of the individual nurse, and less the health authority taking any lead on making sure that the nurses are educated.

This kind of educational support not only advanced individual PHN knowledge and skills, but also contributed to the larger pool of resources within the workplace by encouraging others to take the initiative to extend their knowledge and expertise through ongoing education.

Such educational supports, however, were not consistent over time, or in different areas of the health authority. Chris, from a different local health area, remarked on organizational support for breastfeeding education for nurses with this comment:

It was on and off. I feel that there were a lot of mixed messages around that. Some upper management felt that there was too much emphasis placed on breastfeeding, and there was varying amounts of support for nurses to become lactation consultants – there were very mixed messages there. So, that was very much driven, I felt, from the line nurses, they had that commitment and that was... so yea... there was mixed support from administration there with the breastfeeding and the education.

Support and organizational direction for tobacco cessation was also mixed, despite some of the resources available through Perinatal Services BC, as well as local health authority resources. Taylor described it this way when she talked to new parents about smoking:

It was really just making them aware of some of the hazards around smoking around your children and those kinds of – that kind of teaching came out of our handouts and things that we had. Our public health information. And I don't ever remember going through any kind of program with anybody.

Despite her years of experience, this nurse and others were vague about the approach they might take with new families in relation to tobacco cessation, and none described any specific organizational directives to guide their practice.

Although reference materials, educational opportunities, and supervisory support were available, PHN participants pinpointed their peers as being central to their work with priority perinatal families. This resonates with Falk-Rafael's (2005) critical caring theory particularly with respect to the aspects of developing and maintaining relationships, transpersonal teaching and learning, preparation of self, supportive and sustainable environment, and building capacity of the community. These carative health-promoting practices are often thought of in terms of PHNs working with individuals or families, but are also significant in the workplace environment. PHN participants indicated that good relationships between nurses seemed to facilitate individual as well as team learning. Such team support seemed to affect the workplace environment, which in turn, affected services for priority perinatal women.

#### *Workplace environment.*

The theme of workplace environment incorporates several aspects that participants identified as influencing their ability to work with priority perinatal women. This included such things as staffing levels, budgets and resources, and workplace culture. Staffing levels were a particular issue for Sasha who spoke about recent changes when she described the negative effect that reduced staffing levels was having on nurses' ability to connect with new mothers, to follow-up with concerns, and to maintain their own personal level of skill and knowledge. Differences in staffing levels between rural and urban areas also had an effect, as when Kelly noted that the lack of other community resources put more demands on the PHNs in the community, and thus gave them less time to work with priority families.

Staffing levels maybe reflective of budgetary constraints, as were other resources needed to do the job. For example, the issue of cell phone availability for nurses working in the community was raised by Sam who explained that many priority perinatal women use cell phones as a less expensive method of communication.

Most people text. They don't have minutes for voice, right, so texting. And we share one flip phone with eight nurses. And once I tell a client, they'll be mad I haven't responded, and so I say well, I share it with eight other nurses, well then, they stop texting because they don't see it as confidential.

Communicating with priority perinatal women is essential in maintaining an ongoing relationship and supporting choices around breastfeeding, tobacco cessation, and immunizations. Based on my experience, I can add that organizational budget limits did not allow for cell phones for each PHN, and protection of privacy rules prohibited nurses from using their own personal cell phones, making it difficult for PHNs to maintain a texting conversation with priority families that were often difficult to locate.

Supports for PHNs, staffing levels, budgets, and resources all contribute to the culture of a workplace in positive or negative ways, as do co-workers themselves. Peers have a significant influence on the workplace environment, as described by several participants earlier. However, the effect of challenging staff members on office culture was also raised by PHN participants who noted the impact on both priority perinatal women and on other PHNs. Concerns were raised about the inability of the organization to deal effectively with staff members whose personal problems affected their ability to meet clinical practice standards. Such examples reflect difficult situations that were not easily or quickly resolved by the organization, and which

had a bearing on workplace relationships, the culture of the work environment, and ultimately on the nature of PHN services for priority perinatal families.

In addition to problems with individual staff members, challenges with broader lines of communication within the organization also affected the workplace environment and the ability of PHNs to provide accurate and consistent information and service for priority perinatal women. Chris described such difficulties this way:

I think lines of communication often times could be a problem. So, if you have a topic area and there's multiple committees that are working on different topics and the directions were coming from staff who are attending the meetings, and then management who are interpreting that differently, there's a confusion that can occur in terms of how is that gonna be implemented, and timelines for that, and also documentation. So, I think those are big factors. I think if there's a change in management, that can be a challenge, as well because there's different styles.... And so, there was also issues in terms of multiple directions coming from the Ministry of Health and Ministry of Education.

This PHN participant identified how the complexity of different directives from different levels within the organization led to confusion about what services were to be delivered when, and how they were to be documented.

#### *Documentation.*

During the semi-structured interview process, PHN participants were asked how they knew they made a difference with priority perinatal women. Documentation was one aspect that was mentioned as a way of measuring outcomes, however various perspectives on the consistency, accuracy, and complexity of routine charting were noted. Alex described her experiences with charting.

Everyone seemed to approach it slightly differently. I know when I did my first training in iPHIS, you know I got pages on this is what you do with this, and then I would watch another nurse chart and go “oh well, don’t you do this? And “oh no, I never do that” you know?

Not only does this comment reflect the reliance on other PHNs for direction, but it also reflects the issue of consistency among nurses when it came to charting. Consistency was also a concern in relation to documentation of breastfeeding. Terry commented that sometimes information would be included in narrative notes rather than in the itemized tick boxes of iPHIS. She stated:

I would have included that in my notes, but I don’t know if it was always really, if in iPHIS, if it was in there how to say whether they were solely breastfed or breastfeeding to six months. I tried to. I don’t know if it was really consistent.

Her comments reflect some of the challenges with iPHIS and knowing where exactly to document details.

Other PHN participants highlighted different concerns relating to the documentation of tobacco use. When asked about routine charting of tobacco at baby clinics, Les remarked:

I think maybe at the first visit, but I’m not sure that they (PHNs) were doing that consistently over time because then it becomes almost like hounding the person. So, I think that the tobacco question often times would not be asked at 2,4, 6,12, and 18 months of age. I don’t think that happened.

She explained this further by suggesting that routinely asking about tobacco use at each baby clinic visit might have had an adverse effect on immunization rates, and she projected what she thought some parents were thinking by saying “because their experience is, why do you need to know all this, I’m just here for immunization, and yet you’ve asked me about everything in my

life including if I smoke, which I'm guilty about anyway." When Taylor was asked if she would make a point of documenting tobacco use after a home visit, she responded with "no. I mean I might, but not guaranteed." Taylor also commented on the awkwardness of repeatedly asking about household tobacco use when she said:

For some people, they're just not prepared to talk about it. You can bring it up once and they tell you "I don't want to talk about it", and then it's over. And then you may try again, but it could be a long time before you put your oar back in the water, right?

Although PHNs were expected to document household tobacco use, they recognized the complex nature of each encounter, and sometimes avoided asking about it in favour of maintaining a working relationship.

These examples of documentation all relate to the individual level of care that PHNs provide, and which are recorded in iPHIS. PHN involvement at community and systems levels, however, goes undocumented with the current system. Terry highlighted this when she asked:

How do you document your group work? How do you document some of this community work, because documentation is really focused on the individual, and how do you document on a community? How do you keep that kind of record? Panorama was going to have a piece where we could put in group work or community work, but it never materialized. So again, I think we're really missing that, and I think that it's been somewhat devalued by missing it out altogether too.

Terry went on to point out that PHNs play a significant role at the community level, by saying:

The history of how some of these supports, community supports, started in the first place gets forgotten because they become their own entity, and they have their own life. They sometimes forget that, you know, they might have been there now for 15 or 20 years, but

15 or 20 years ago they were really the idea of public health nurses who were trying to find ways to support their clients outside in the community, and trying to get other people interested in supporting it, and finding funding that was not related to the health authority. So, I think sometimes it gets forgotten because again, it doesn't get documented clearly in some of the things that public health nurses do.

Terry expressed her concerns about the lack of ways the health authority had to record and recognize the work that PHNs do to improve outcomes at the community level, and how this information gets lost over time. The provincial government's Model Core Program Paper for Reproductive Health (2009) acknowledged the importance of monitoring and evaluating services by stating:

It is recognized that although public health, and prevention programs in particular, are difficult to measure, it is nonetheless likely that we will be able to manage – and improve – core functions in public health if we can measure performance. A prevention information system capable of measuring success is necessary for this purpose. As well, the public has a right to expect that the public health sector, along with the rest of the health care system, is paying attention to the quality and effectiveness of the interventions it undertakes, and is working to improve that quality.

The need for evidence of performance is also alluded to in the health authority job description for PHNs, which identifies the requirement to “maintain related records, document assessments, plans, interventions, outcomes and evaluations”, and further that PHNs are expected to participate in “quality assurance activities and projects by collecting and compiling statistical data for research and evaluation purposes”. The job description includes provision of services at the individual, group, and community levels, however, when there is no official

record of such group or community level activities, the value of that work may be overlooked, and the ability of PHNs to continue such work may be affected by changing program directions and adjusted priorities.

*Shifting priorities.*

Over time, changes at the Ministry of Health and changes at the health authority level have had an influence on program priorities for PHNs. Kelly explained how organizational priorities and staffing levels had a bearing on her work.

The work seems to be all about immunizations, and there is visiting babies, that's part of the work, but I sometimes feel that it's maybe lost some of its importance and what really matters is getting those immunizations stats up. And you know, it's a manpower issue, and when nurses go on vacation or when nurses leave there's a recruitment lag, and you know I'm always, I think back to how much of the budget, the global healthcare budget should come to public health, and how much we actually get. And if we got what we should get and if that actually trickled down through the organization, through the health authority, to the front-line nursing, I think that would be a very positive thing, I think we would quite possibly have more nurses. We would certainly have better technology to support us in doing our jobs like cell phones and tablets, so we don't have to double chart everything.

Jamie also described the impact of staff shortages from illness or vacation, and how immunization clinics took precedence over visiting priority families.

I know when people wouldn't show up for work and all of a sudden vaccine – you know they were down for a clinic and somebody had a high-risk family they were visiting that

afternoon, and so priorities being immunizations, we had to shift our time with that high-risk family and take on that clinic.

Both these PHNs highlight the tensions between organizational expectations to improve immunization rates, and the value of contact with new mothers where relationships are established, and which may in the long run help to improve immunization rates. I can add that at that time in this organization, because PHNs were not replaced for vacation, workload was increased and the ability to deliver the full range of services was decreased. Not only does this situation influence relationships with priority mothers, as described in Falk-Rafael's (2005) critical caring theory, it also affects relationships among PHNs who must cover for each other. In addition, such shifting priorities signal challenges to a supportive and sustainable work environment (Falk-Rafael, 2005). Examples such as this are a result of shifting priorities not only at the individual PHN level, but also at higher levels within the health authority.

Fluctuating educational opportunities sponsored by the health authority is another area that participants underscored when discussing shifting priorities. Sasha noted how organizational support for education around tobacco was established but not sustained over time.

So, although it pops up every now and again, it's just not a sustained effort to make sure that staff stay up to date, or staff stay current, or that new staff get educated in that. So, I think that initial push really made that big difference when we first started with the harm reduction, but I think right now, what I see is, is it's fallen off into the less important, some people don't even ask the question any more. It's not happening in CHC (immunization clinics) as much. It's considered a lower priority.

This comment refers to how PHNs were initially trained and encouraged to discuss tobacco cessation with families as they came into baby clinics, but how over time the focus on tobacco faded in light of other expectations.

At other times priorities emerged unexpectedly and demanded everyone's attention. The H1N1 influenza pandemic of 2009 was an example that Chris referred to when she said "definitely that was a huge factor at the time in trying to do any other work. I think at that time I just felt like that winter all I did was flu (immunizations)". Such an event resulted in a significant shift in priorities for PHNs, limiting the amount of time to connect with priority perinatal families for several months.

These examples describe shifts in priorities over time that may have been predicted and planned, or that may have been unexpected, but all of which required PHNs to adjust course and adapt to new ways of providing service. Nurses described how they accommodated these changes independently and with flexibility and initiative.

### ***PHN Attributes.***

Three themes seemed to emerge together as I reviewed the interviews and supporting documents, and explored the ways PHNs navigated the challenges they encountered with priority perinatal families. Somewhat different from external organizational influences, these factors describe attributes of PHNs including the independent, autonomous nature of PHN practice, and how personal flexibility and initiative helped achieve positive outcomes with priority perinatal women.

*Independent practice.*

In discussing the nature of their practice related to the time frame of this study, many nurses spoke about the independent nature of their practice, and how they appreciated the ability to work with individuals and communities. Kim described it this way:

I would say that I feel really fortunate to have the ability to umm, make my own plans and provide care to women, you know, according to their needs in my own creative ways. With, of course, the following of proper policy and protocol, but, umm, I would say that there's been a lot of flexibility that way.

Cameron echoed these sentiments when she said:

I think we followed criteria to a point, but like, even now, we don't. Like we wouldn't rule someone out just because they didn't – if they needed the support and asked for it. If they didn't have all the tidy boxes ticked, we'd still do it.

Both these nurses recognized and respected the general guidance and direction provided by the health authority, but both used their own judgement when it came to working with families.

With more recent program changes, however, some PHN participants expressed concern about how newly imposed limits to the independent nature of their practice might affect outcomes with priority families, and lamented the loss of something they saw as valuable. Val described it this way:

Because of the changes that we've made it was much easier before for them (PHNs) to know how to visit, and for them to be able to rely on their own judgement as to who needed a visit. Not a sort of a rigid based on how many – whether this is a primip or a multip – because in fact we know that multips sometimes can get into as much or more trouble sometimes than primips because they get very busy, and sometimes they forget or

they're laid back, and they haven't noticed and you know, they can get into just as much trouble and sometimes more than a primip. So, they feel they're not being allowed to use their judgement on who to visit anymore, and so they feel that it's really hard for them to identify and say, well this mom really needs a visit, and try to fit it into the criteria that they're supposed to be using.

Such concerns reflect a shift in the organization's support for independent PHN practice, which PHNs felt would inhibit their ability to identify and work with priority perinatal women. By adhering to strict guidelines about which new mothers are allowed visits, Val felt that priority women would be missed, and not offered appropriate follow-up care.

Similarly, PHNs reflected on the loss of participation at the community level that would have supported priority families in a broader way. Francis explained it this way:

The independence that you would have is more curtailed, and it's sort of prescribed, and also beyond that. We used to look at the community as our client, sort of idea. Do you know what I mean? And that seems to be dwindling. Like it seems like we've got these programs, and we're going to do them in this certain way, following these criteria. I don't know, to me, sort of something has been lost, some of our expertise is lost when we, when we follow such a rigid format.

Although acknowledging that structure is important in a health care organization, these nurses recognized that autonomous practice is an essential element of their work as public health nurses. Practicing to the full scope of their abilities, and working independently in a self-directed way is a basic component of the Canadian Community Health Nursing Standards of Practice (2011).

*Flexibility.*

Working independently seemed closely tied to flexibility in that nurses could deliver service in ways that recognized the unique nature of individuals, families, and communities. Working alone in the community visiting new mothers or working with groups often meant being flexible in one's approach. Dana expressed it this way:

I really appreciated the fact that there is no one way of doing something, or speaking with clients, or approaching people because we do have to meet them where they are and go from there, but of course with following all the proper procedures and such, but there is flexibility within that, which I've found to be of great value.

Alex further described the need for flexibility in dealing with unexpected challenges.

I think when you're faced with a family that you – okay this is a really different family, now what am I gonna do here? And you have to come up with your own ideas and then bounce them off somebody else and say, okay, do you think this is the right thing to do? You actually have to think through the whole process. And I think the danger – I think checklist and assessment forms are great as a tool, but not forgetting the fact that there are individuals involved here, there are people involved here. And every family's needs are different and we can't just treat everybody the same. I think, and I think that's where the education around public health nursing is really important. That we are still educated to be really critical thinkers and be confident in our own skills and our own assessments, and also working as a team to problem solve together.

This example reflects the flexibility required by PHNs working with challenging families to help them achieve healthy outcomes. Critical thinking, making decisions that fall outside of the usual

protocols, being confident in those decisions, and respecting the individual needs of each family are all reflective of the things PHNs do to work successfully with families

*Initiative.*

Initiative, flexibility, and independent practice empowered PHNs to work at various levels to support breastfeeding, immunizations, and tobacco reduction. Sam provided a good example of taking the initiative to improve her own skills and knowledge when she spoke about her personal need for further education.

One of the other things that probably made the biggest influence on my practice is I decided that I was getting a little rusty on my breastfeeding skills, so I did some course work and some upgrading and then I went on to teach the Douglas College Breastfeeding course for breastfeeding counselors and there's nothing like, you learn it so much better when you're teaching it. So that was another, all of the knowledge I gained from that was really, really valuable to me and became an imminent part of my practice.

By improving her own skill and knowledge around breastfeeding, Sam not only became a valued resource to her clients, but also to her co-workers, and to others in the community through teaching at the community college. Such initiative taken to improve one's own knowledge and skill through continuing education resonates with Falk-Rafael's (2005) carative health promoting processes of preparation of self, as well as building supportive sustainable environments, and building the capacity of communities.

Les provided other examples of the kind of activities that PHNs undertook on their own initiative to promote community support for breastfeeding.

Early on we did lots of those community activities where we really built the community initiative, or I remember getting different people in the community to write articles for

the newspaper on breastfeeding from being a dentist, or getting pharmacies on line with breastfeeding, going out and working with the different pharmacies to only stock the better-quality breast pumps. Yea, so that's where PHNs, they can be so accessible, we have so much flexibility in our jobs, we're not totally defined, which is a wonderful gift.

Taylor provided another example of such initiative by describing different approaches that PHNs took at the community level to maintain ongoing support for breastfeeding:

We had breastfeeding day you know, where people would gather at the library and see how many women you could get into the library breastfeeding at the same time, and that was advertised locally in our paper and through the health unit nurse. One of our nurses would help coordinate that along with somebody else, like partnering with a family services worker and doing some partnership with two or three others, and then we would support that at the health unit as well and put up a lot of information around that. As far as community, we used that day to advertise and put articles in the paper as well. Umm, yea, so for breastfeeding, yea... I mean to me breastfeeding is well received now. I feel that we've come a long way in the last 50 years with the support, you know, supporting breastfeeding – or maybe the last 20 or 30 – really, of breastfeeding being the given.

Not only does this comment reflect an example of the creative approaches PHNs took to promoting breastfeeding, but it also echoes the concepts of time and relationship development with other community partners, and indicates the gradual shifting over time of community attitudes around breastfeeding. Such community activities are not formally documented in any consistent manner, so when program changes occur that affect the time available for PHNs to practice independently in this way, the impact on breastfeeding outcomes for all new mothers including priority women goes unnoticed.

Although these kinds of community activities were not solely targeted at priority perinatal women, the goal was to improve outcomes at a population level, which included priority families. With this in mind, PHNs often initiated projects at the community level to prevent or reduce tobacco use. Some areas provided long term elementary school education with hopes of preventing students from taking up smoking, and eventually becoming non-smoking parents. Terry felt that smoking had decreased over her years of experience, possibly due to a variety of approaches taken at different ages from elementary school, to youth clinics, noting that “there’s little bits of information that you can implant along the way that might make an impact when they are child bearing.”

There was also recognition that for new parents, quitting smoking was very difficult. Kelly put it this way:

I think smoking is the hardest one. I think it also is a very difficult addiction, and I think we have a harder time making an impact on that one. But I think we did do good work in the pre-perinatal area when we were doing the other programs in school there.

PHNs recognized the importance of being flexible and creative with priority parents that did smoke. Jamie described how she helped new parents deal with the issue of smoking, and the overwhelming amount of information they received:

I think we’re really helpful at helping them to choose what was really the important one. So, for the dad to just feel this is a huge gift I’m giving to go smoke outside, and to make him feel really validated in that because sometimes all that they might have been feeling is the criticism that they were smoking. But to feel that they were making a really strong choice, and a really good choice to smoke outside, so coming to – just recognizing them for what they were doing, not for what they were not doing.

Jamie recognized the small gains that could be achieved, and the relationship that was maintained, all of which may help to support longer term changes within the family.

Sasha described the effect of the many ways that PHNs have found to help reduce the exposure of infants to household tobacco use:

I think what we have won the battle on is smoking outside the home, washing the hands, the smoking jacket. There is a recognition that smoking is bad and it's not, you should not do it around babies. I think we've had a significant impact on that.

In addition to tobacco use, PHNs also described flexibility and initiative around immunizations for priority parents. In reference to the priority perinatal women on their caseloads, Chris explained:

Because we kept in touch with them, a lot of the nurses would do the immunizations privately, like outside of our regular clinic time, and try and accommodate those families as much – and we still do this – so that they, if a clinic time didn't work for them, and they were in the building for another appointment they could come in and have their immunizations done. Trying to lessen, or pull down the barriers to them getting those done around transport and things like that. I think we've make a huge difference.

Kim described how she had been working with a priority family to encourage them to come in for immunizations, but eventually realized that they didn't have money for a cab or bus fare. After talking with her clinical coordinator, she found that “there was money available for cabs for clients at least to get them to the health unit, and the client took me up on that and we were able to meet and vaccinate her baby.” Looking for opportunities, finding ways to support families, and celebrating the small gains through flexibility and initiative were just some of the

ways that PHNs maintained trusting relationships with families and built the capacity of communities to achieve better health outcomes.

***Summary of qualitative findings.***

Interviewing PHNs was the primary approach used to explore the organizational factors that affect the work PHNs do to support priority perinatal women in achieving the three outcomes of interest. Throughout the course of these discussions, nurses described their impressions of what had worked well, and not so well over time. In addition to my own participant observations and reflections, also included in this analysis were guiding documents from the health authority, the province, as well as national organizations, which provided direction for PHNs in their work with priority perinatal families.

The process of thematic analysis of the interviews and materials helped me to identify ten areas that reflected organizational influences, both positive and negative, on the ability of PHNs to achieve intended outcomes with priority perinatal families. Many of these themes affected, and were affected by other themes. For example, the workplace culture and environment might have influenced the initiative that PHNs took in their work with individual, community, or systems level activities. At the same time, shifting priorities might have a significant bearing on the work environment.

Some of the themes identified were reflective of several of the carative health-promoting processes that guide PHN practice as identified by the critical caring theory (Falk-Rafael, 2005; Falk-Rafael & Betker, 2012a). For example, building and maintaining relationships was not only mentioned by every PHN interviewed, but the concept of relationships was strongly linked to the theme of PHN supports, as well as workplace environment. Figure 4 depicts the convergence of the carative health-promoting processes with the themes identified in this study, outlining the

connections and influences among them. Although there was some overlap between the themes and the carative health-promoting processes, the grouping of organizational factors seemed to comprise an additional process that was absent from the critical caring theory.

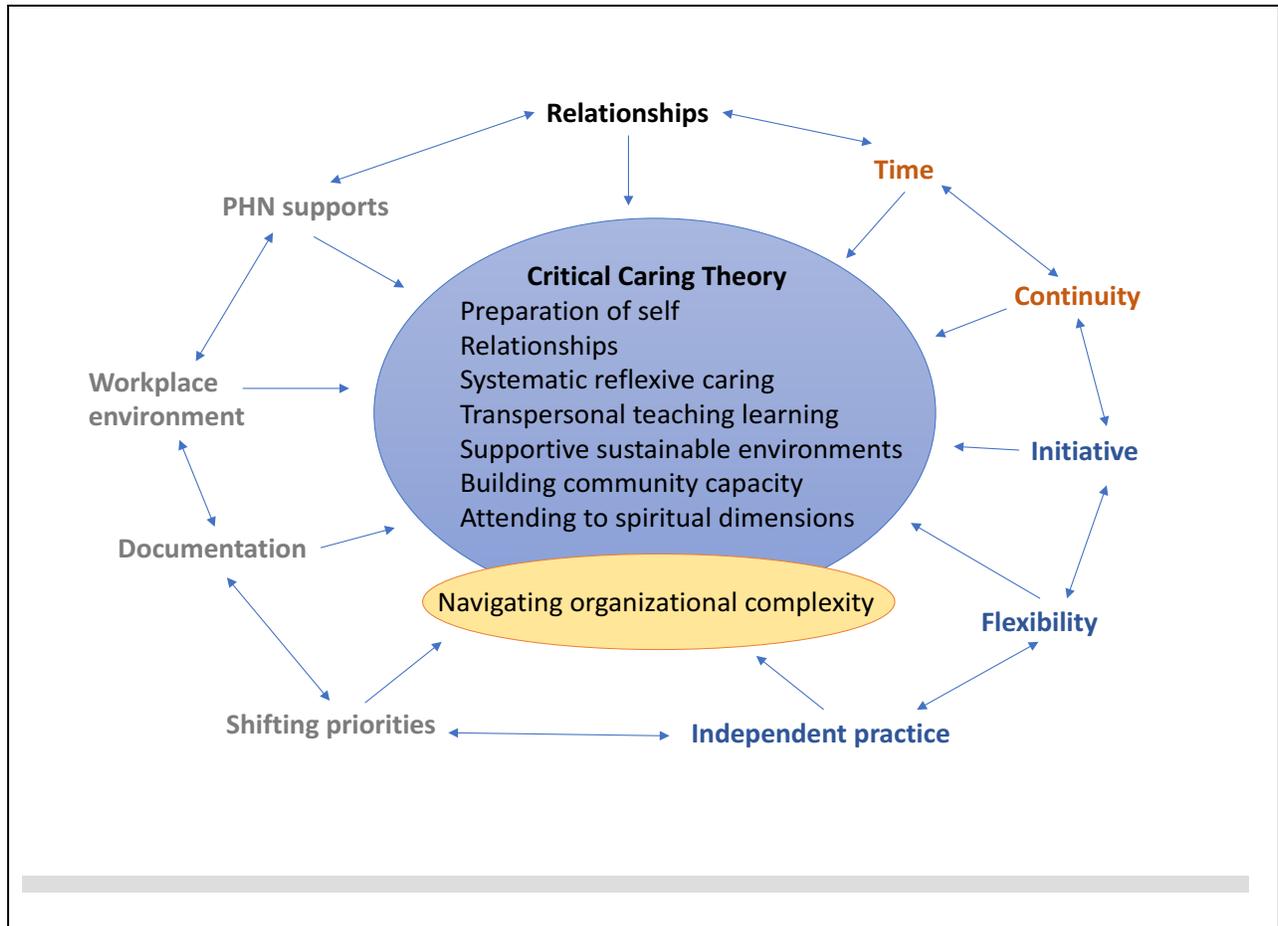


Figure 4. Emerging themes related to Critical Caring Theory (Falk-Rafael, 2005). The overlapping complexity of the organizational and individual influences in relation to the carative health-promoting processes of the critical caring theory is depicted, including the addition of “navigating organizational complexity”.

This additional process, which I have termed *navigating organizational complexity*, describes how PHNs navigate the many changing influences of the organization to exercise control and autonomy, and to achieve successful outcomes at the individual, community and systems levels. This new entity is discussed further in the next chapter but reflects an important proposed addition to the critical caring theory. The influencing factors that were identified fell

into two general categories; areas that were controlled and directed by the organization, and areas that were driven by the individual PHN, and all of which were shaped and affected by relationships. Figure 5 shows how the critical caring theory is extended by the addition of this proposed new carative health-promoting process, which describes how PHNs navigate the various factors within the complex environment of the organization at individual, community, and systems levels.

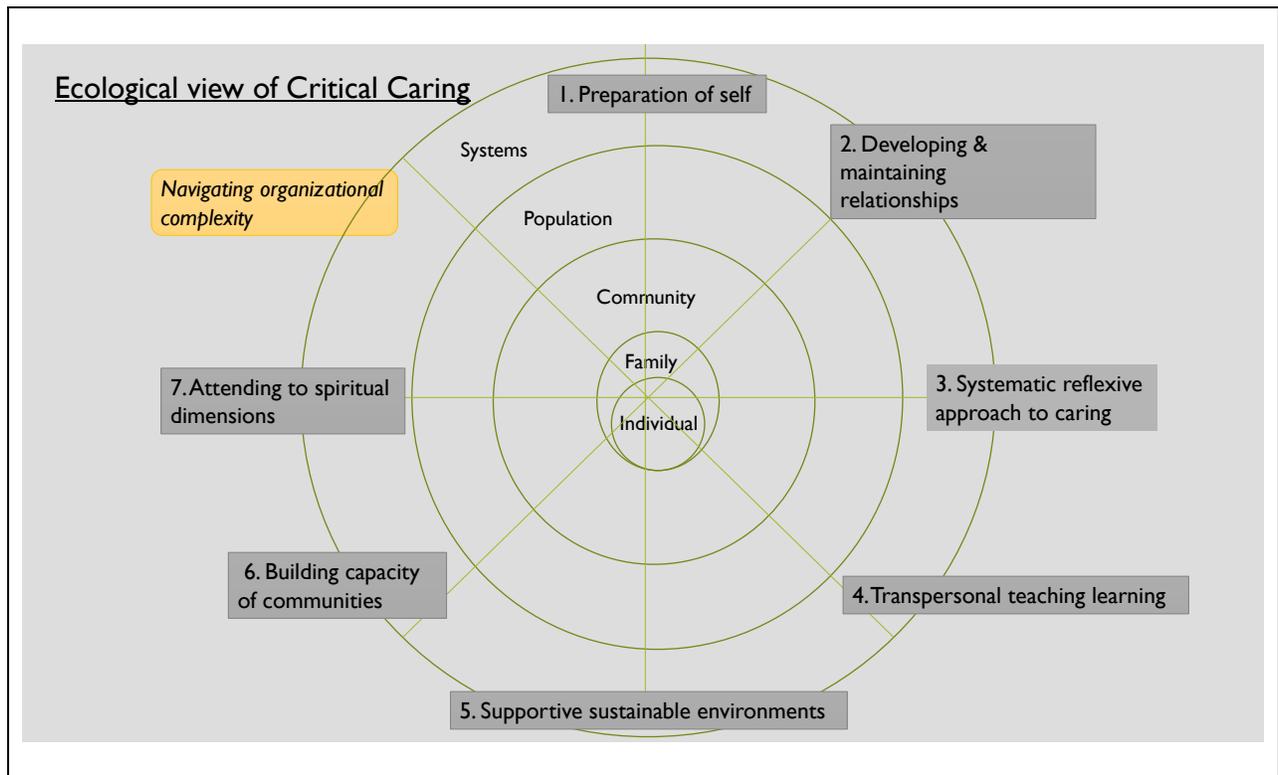


Figure 5. Extended View of Falk-Rafael’s (2005) Critical Caring Theory. An ecological perspective showing the seven original carative health-promoting processes with the addition of navigating organizational complexity.

The complexity of organizational influences on the work that PHNs do with priority perinatal families has been illuminated by the words of these nurses. It is interesting to consider how, over time, these factors can have a substantial effect on the ability of PHNs to support

priority perinatal women in achieving the three outcomes of interest. These influences are explored further in chapter 7.

## Chapter 7 – Discussion and Conclusions

The purpose of this retrospective study was to investigate how routine, every day public health nursing practice affected outcomes related to breastfeeding initiation and duration, infant immunizations, and household tobacco use among the population of priority perinatal women who received additional and ongoing PHN services. For this study, the population of priority perinatal women was defined as those women who received five or more postnatal contacts from PHNs. These ongoing connections were established when PHNs determined that these families may be negatively affected by the social determinants of health. Furthermore, this study explored how the context of the everyday work environment of PHNs influenced their practice, and ultimately the achievement of those health outcomes. In this mixed methods case study, I examined administrative data from routine PHN documentation to measure the three outcomes of interest. At the same time, to identify themes related to organizational influences, I also conducted semi-structured interviews with PHNs, and reviewed guiding documents, which provided direction for PHN practice during the time frame of the study. The two research questions established for this study were:

- How does additional and ongoing PHN contact with priority perinatal women relate to breastfeeding, infant immunizations, and maternal tobacco use compared to the general population of new mothers receiving usual services?
- How do organizational factors affect the work PHNs do to support priority perinatal women in achieving these outcomes?

This chapter brings together the findings from the quantitative and qualitative components of the study to answer these two questions. First, however, I provide a brief review of the philosophical, and methodological foundations employed, and the theoretical framework used in

this study, before turning to an interpretation of the research findings, and the conclusions reached. This is followed by a consideration of the findings in light of current research, the contribution to nursing knowledge that this study has made, the limitations of the study, implications for PHN practice, policy, and research, and finally concluding remarks.

### **Review of Philosophy, Methodology, and Theory**

Critical realism is a philosophy that guided this research, and which acknowledges not only the reality of science, but the social aspects of humans, and highlights the importance and influence of human perspectives (Clark et al., 2008). A case study design was selected to learn more about the differences that PHNs made with priority perinatal women, and to explore outcomes in three communities within one health authority over a four-year period. Both quantitative and qualitative evidence including numerical data, as well as interviews and documents were used in this study.

To guide this mixed methods case study, I drew on the theoretical framework of critical caring, a mid-range hybrid theory for public health nursing developed by Falk-Rafael (2005; Falk-Rafael & Betker, 2012a; 2012b). Critical caring provided a theoretical and analytic framework for this case study, which examined the relationship between PHNs and the priority population of women within the complex environment of the healthcare organization. Further discussion of this theory will evolve as the findings of the study are brought together to generate conclusions about the difference that PHNs make for priority perinatal women.

### **Interpretation of Findings**

Results from the statistical analysis of administrative data show that priority women, who received five or more postnatal contacts from PHNs in the three local health areas, initiated and continued breastfeeding in higher proportions than expected, based on current research literature

(Ahluwalia et al., 2005; Bolling et al., 2007; Eidelman & Schanler, 2012; Renfrew et al., 2012). Household tobacco use among this group of priority women was significantly higher than among the general population of new mothers, which was consistent with the research literature (Adams et al., 2008; Erickson & Arbour, 2012; U.S. Department of Health and Human Services, 2014). Finally, children of priority mothers were fully immunized in a slightly higher, but not significantly different proportion than children of the non-priority population, contrary to research expectations (Falagas & Zarkadoulia, 2008; Feemster et al., 2009; Kim et al., 2007; Luman et al., 2003; Public Health Agency of Canada, 2003). The themes that emerged from the interviews with PHNs and the review of documents provide background context and explanation for the kinds of organizational factors that may have influenced the ability of PHNs to provide additional and ongoing support to priority perinatal women in achieving these three outcomes of interest.

In the next section I respond to the two research questions by discussing each outcome in light of the related statistical results, influential themes, more recent literature, and possible rival explanations. I discuss how the carative health-promoting processes of the critical caring theory add credibility to the findings, while at the same time are verified and extended by the findings.

### **Breastfeeding initiation.**

The initial research question asked how additional and ongoing PHN contact with priority perinatal women was related to breastfeeding outcomes compared to the general population of new mothers. Research literature has indicated that breastfeeding initiation and duration rates among the population of priority perinatal women are likely to be lower than that of the general population (Ahluwalia et al., 2005; Bolling et al., 2007; Eidelman & Schanler, 2012; Renfrew et al., 2012). Results from this case study however, show that across the three communities

studied, 95.3 percent, or 325 priority perinatal women chose to initiate breastfeeding, which was a significantly higher rate of breastfeeding initiation than the 50.8 percent, or 1191 women of the non-priority population.

The use of administrative data reflects a lower than expected rate of breastfeeding for the non-priority group. As a rough comparison, Statistics Canada reports an 89 percent rate of breastfeeding initiation for the general population of mothers in 2011-2012 (Gionet, 2015), and in BC an average rate of 72.2 percent of all new mothers from 2009 to 2012 (Perinatal Services BC, 2015b). So, while the administrative data documented by PHNs in this case study reflects a lower than expected rate of breastfeeding initiation for non-priority mothers, it also reflects a very high rate for the priority group, even higher than the national average. This high rate of initiation for priority mothers is encouraging, particularly considering expectations of lower rates for priority women in other research literature (Ahluwalia et al., 2005; Bolling et al., 2007; Eidelman & Schanler, 2012; Gionet, 2015; Renfrew et al., 2012).

Before discussing the difference between the priority and non-priority initiation rates, it is essential to consider the source of information upon which the various calculations are made. There are several aspects to consider with the use of administrative data for determining rates of breastfeeding initiation and duration. First, the administrative data used in this study only involves information entered into iPHIS by PHNs, and not information from other community healthcare providers. There were also some exclusions to this data set, such as infant deaths, and families that moved out of the area. Consequently, this data set does not reflect the total population of all women giving birth in the three local health areas, and may be why the breastfeeding initiation rates for non-priority women appear to be lower than expected. This

administrative data does, however, reflect the population of priority and non-priority women who received a range of services from PHNs during the time frame of this study.

To establish the percentages of women continuing to breastfeed at later stages, calculations were based on the numbers of women who started breastfeeding at delivery, rather than the total population of new mothers. Based on my experience in this health authority, I know that while most women in this data set would have had early postpartum contact with PHNs, others would have had that early postpartum contact with midwives at home deliveries, or with First Nations care providers. In these cases, there would be no breastfeeding information entered into the mother's iPHIS *postpartum* record, or the child's *newborn* record. From the data set obtained from the BC Centre for Disease Control, it is not possible to determine how many women fell into this category. In this case study, the data used to establish the baseline for breastfeeding initiation came from the *postpartum* and *newborn* records, and therefore may have been lower than actual rates. Mothers of these children may have received their initial postpartum follow-up from other community service providers, but they later brought their children to immunization clinics run by PHNs, where a range of health assessments were provided and documented in the electronic health record. This may help to explain why, in this study, non-priority mothers seemed to have such low rates of breastfeeding initiation, but higher rates at the six month period.

Among the priority group of mothers, the *postpartum* and *newborn* records appeared more complete. This may be due to earlier prenatal contact between these women and PHNs. Although the determination of priority status in this study was based on the number of postpartum encounters with PHNs, the higher rate of breastfeeding initiation may reflect the early prenatal identification and ongoing support of priority women by PHNs. The guiding

documents reviewed included several from this health care organization and from the provincial level that clearly outlined the role of PHNs in establishing connections with priority women in the prenatal period. In this way, relationships with knowledgeable and skilled nurses would have been developed, and teaching and learning about breastfeeding would have taken place.

Prenatal breastfeeding intention has been shown to be a strong indicator of breastfeeding initiation and duration (Donath, Amir, & the ALSPAC Study Team, 2003). A study of prenatal exposure to breastfeeding information revealed that prenatal women who had more knowledge, whose families prenatally supported breastfeeding, and whose healthcare providers supported breastfeeding were more likely to initiate and continue breastfeeding (Kornides & Kitsantas, 2013). Even though there was no information provided in the iPHIS dataset about prenatal encounters with priority perinatal women, it was the practice of PHNs in this health authority to connect with priority women prenatally if they became aware of them. Such early contact may have had an influence on the high rates of breastfeeding initiation among this priority group of mothers.

The amount of this kind of prenatal contact is not known because the data obtained from iPHIS for this study did not include the number or nature of prenatal contacts with priority women. This is because such PHN encounters were documented in the *narrative notes* for individual mothers, and *narrative notes* were not requested from the BC Centre for Disease Control for this study due to issues of privacy and confidentiality. This lack of prenatal information about priority women is a limitation of this study, however future studies of this nature might benefit from incorporation of prenatal contact information, perhaps through an improved public health information system designed to capture more measureable data in a consistent fashion. Although prenatal information was not included in the data set for this case

study, iPHIS data regarding the numbers of women breastfeeding at birth was provided and forms the basis upon which the rates of breastfeeding at subsequent intervals are calculated.

### **Breastfeeding duration.**

When calculating the rates of continued breastfeeding at six, twelve, and eighteen months, data about feeding practices were obtained from the child's *early childhood* record, in which feeding of breastmilk, mixed feeding, or formula feeding was documented. The World Health Organization encourages exclusive breastfeeding until six months of age, and defines exclusive breastfeeding as “no other food or drink, not even water, except breast milk...for six months of life” (World Health Organization, 2017). Based on my experience working in this health authority, however, the meaning of *exclusive* breastfeeding was not clearly defined at the time the administrative data were recorded, or consistently used by PHNs when enquiring about infant feeding at immunization clinic visits. For the purposes of this case study, data collected about breastfeeding at different ages combined both the breastmilk and the mixed feeding categories, because my research interest is in the duration of breastfeeding over 18 months, and not whether it was exclusive in nature for the first six months.

If, at any of the immunization visits, the inquiry into feeding practices was not made, then there would be no information documented by the PHN. Based on my experience in the field of public health nursing, having worked in and observed many childhood immunization clinics, the 12 and 18-month visits tend to focus more on a wider range of topics including child development, behavior, safety, dental health, as well as broader nutritional information, and less directly on the particular issue of breastfeeding, thus there may be less data available about the levels of breastfeeding at different ages.

Regardless of the exclusive or non-exclusive nature of breastfeeding, the information

documented by PHNs about infant feeding at six, twelve, or eighteen months was compared to the initiation rates for each of the priority and non-priority groups. If the initiation numbers for the non-priority group were lower than actual numbers, this would lead to a seemingly lower percent of initiation. When this lower initiation rate for non-priority women is used to compare with the initiation rate of priority women, it could result in erroneous statistical differences between the two groups. The possibility that the rates of non-priority breastfeeding initiation are lower than expected is strengthened by the observation that in one of the local health areas involved, data gathered for non-priority mothers breastfeeding at six months was higher than the numbers breastfeeding at birth. In this case, concerns about the accuracy of initiation data for the non-priority group become less important because the focus is on the initiation rates of the priority group. The difference between the two groups is one aspect of the research question about the outcomes of interest, but the actual rates of breastfeeding initiation and duration for the priority group are of primary interest.

Analysis of the administrative data for all three areas revealed that at six months postpartum, 49.8 percent, or 162 mothers of the priority population who had initiated breastfeeding were continuing, compared to 72.3 percent or 861 of the non-priority mothers. Although this is significantly lower than the non-priority group, it is remarkable that the numbers and the proportions are still very high in relation to general rates of breastfeeding across the country. Statistics Canada indicates a rate of 41 percent for exclusive breastfeeding at six months for the general population in BC for 2011-2012, and 26 percent across Canada in this same period (Gionet, 2015). Although the breastfeeding rate for priority women at six months for the three areas in this study was 49.8 percent, it cannot be defined as exclusive. Despite that, this is possibly a positive indicator of breastfeeding skill and knowledge among a group of women who

were not expected to breastfeed as long as non-priority women. With 72.3 percent of non-priority mothers still breastfeeding at six months, the difference between these two groups is significantly different, but it is noteworthy that almost half of the priority group has continued breastfeeding to some degree as long as they have.

By twelve months the numbers of priority mothers breastfeeding had dropped to 80 women, or 24.6 percent of those who originally started, which is not significantly different than the 29.5 percent of the non-priority group. A search of the Statistics Canada and the Public Health Agency of Canada websites for comparative national or provincial rates did not reveal any information for rates beyond six months. However, in the United States a rate of 26.7 percent at twelve months for the general population of mothers was reported for 2011 by the National Center for Chronic Disease Prevention & Health Promotion (2014). If the priority mothers in this case study are still breastfeeding at the same rate as both the non-priority group, and the general American population, then this is also a promising finding.

By 18 months postpartum 32 women, or 9.8 percent of the original priority mothers in this case study continued to breastfeed, compared to 11.4 percent of the population of non-priority mothers. There was also no statistically significant difference in proportions between the priority and non-priority groups continuing to breastfeed at this stage. Given the expectation that priority women would not continue breastfeeding as long as non-priority women, these are noteworthy findings. The administrative data in this study reflect a drop in rates as children grow older, which is to be expected. By 12 and 18 months, toddlers are eating a wider variety of foods, and concerns about their weight gain at this stage are not as critical as in the early months of life. At each immunization clinic visit, documentation of various assessments was done, and parents' concerns addressed, but when feeding issues were not discussed, they were not recorded. This

may be one reason why breastfeeding rates appear to drop off in the later months, and may not reflect actual rates of continued breastfeeding.

PHNs who worked in these local health areas, and who were interviewed for this study repeatedly identified the importance of establishing trusting relationships with priority women as being an influence on successful breastfeeding outcomes. In addition, PHNs spoke about the time and flexibility needed to develop such relationships, and how that time was not simply based on the daily work priorities, but that service continuity over years had an influence on relationships both at the individual level as well as at the broader community and systems levels. These nurses also recognized and valued the breastfeeding knowledge and skill they had acquired either from educational opportunities offered by the employer, or through their own personal efforts and experience, as well as the support of other expert PHNs in the workplace. By describing a reflexive approach to caring, being open and responsive to family's needs, and actively involving women in the teaching-learning approach, these PHNs provided examples of ways in which they felt they made a difference in breastfeeding outcomes with individual priority mothers.

In this case study, PHNs noted that the establishment of relationships was an important factor in influencing breastfeeding decisions among priority perinatal women, which also aligns with the literature. In an integrative review of factors influencing breastfeeding in adolescent mothers, Kanhadilok and McGrath (2015) found that support from professionals and partners led to positive views of breastfeeding initiation and continuation, and that promoting maternal competence and beliefs about being a good mother were also important for success. Similarly, in a meta-synthesis looking at supporting breastfeeding establishment with socially disadvantaged women, MacVicar, Kirkpatrick, Humphrey, and Forbes-McKay (2015) found that technical

expertise along with positive, culturally appropriate support and encouragement helps mothers to gain confidence in their ability to breastfeed successfully. This recognition of the importance of relationships was also found through a systematic review of factors influencing infant feeding decisions in the prenatal period (Roll & Cheater, 2016). Roll and Cheater (2016) found that professionals could be supportive and knowledgeable, but could also come across as being judgmental or pressuring mothers. This review also noted that the influence of significant others and peers was especially important to teen mothers, which may be reflective of community attitudes towards breastfeeding (Roll & Cheater, 2016).

Over the years that I was involved with this health authority I observed that through continued efforts at the individual, community and systems levels, the local culture of breastfeeding in this health authority shifted to one where many women not only established and continued breastfeeding, but contributed to the building of supportive and sustainable communities by becoming supports to their own family members and friends when they had questions or concerns about breastfeeding. The various examples depicted by PHNs about relationships, about their personal preparation, about their approach to caring and to teaching and learning, the support of the environment and building of community capacity, all reflect the carative health-promoting processes of Falk-Rafael's (2005) critical caring theory. Regardless of how long priority mothers continue to nurse their children, their initial success, supported by PHNs, likely helps to improve the health of children, mothers, as well as communities.

The comparison between the priority and non-priority groups provides a picture of the normal culture of breastfeeding in these communities in relation to a group of mothers who are expected to have lower levels. The results from this case study show that at 12 and 18 months priority women continued to breastfeed in the same proportion as the non-priority group. There

are many reasons why individual women may have chosen to continue breastfeeding or not, however there are some organizational factors that may have influenced PHNs who were then less able or available to support breastfeeding. These are the subject of the second research question, which sought to explore the organizational factors that affected the work that PHNs did with priority perinatal women, and which may provide some answers.

***Organizational factors.***

There were several organizational influences that emerged in the analysis of themes, including PHN supports, shifting priorities, the work environment, documentation practices, and the sanction to practice independently. Although these factors had a bearing on all three of the outcomes of interest, there were some factors that were particularly relevant to the ability of PHNs to support priority perinatal women in successfully continuing to breastfeed.

***PHN supports.***

During the interviews, PHNs often mentioned the importance of support from their PHN colleagues when it came to their initial orientation to public health nursing, to learning from other PHNs, to receiving assistance with difficult client situations, or to working together with other colleagues to initiate and coordinate community events. Support for PHNs from the health care organization also included such things as ongoing education about breastfeeding, the provision of adequate budgets for resources such as breast pumps, and adequate staffing levels with the necessary skills to provide breastfeeding expertise to mothers and other community partners. PHNs discussed the effect of the presence or absence of some of these supports, explaining how, for example, the broad-based approach to breastfeeding education for all nurses made a positive difference to their knowledge and skill, which in turn supported women with breastfeeding difficulties. It was also noted, however, that over time when other things became

more important, this educational support was diminished, and newer PHNs were disadvantaged by not having the same level of training.

*Shifting priorities.*

This kind of shift in priorities, when education was not deemed as important, had an influence on the ability of PHNs to work effectively with priority women having breastfeeding challenges. When breastfeeding education for PHNs was an established priority, participants reported that the overall level of knowledge improved. However, they also noted that at other times priorities would change and communicable disease follow-up, or immunizations might take centre stage. The H1N1 influenza pandemic of 2009 is an example of a considerable, but temporary shift in priorities. At other times, even the daily shifting of priorities when nurses had to cancel visits with priority women to cover an immunization clinic for an absent nurse, had effects on those women who needed immediate breastfeeding support. PHNs interviewed spoke about the constant shifting of work priorities, and both the positive and negative impact they had on supports for PHNs, as well as the work environment.

Working in this health authority, I have similarly observed how shifting priorities affected workload, workplace culture, and the continuity of services, which also affected the amount of time available for maintaining relationships with individual priority women, and with community partners. There are only so many hours in a day, and these hours can be consumed by a range of other demands including program changes, staff shortages, or dealing with negative relationships between coworkers. The effect of such shifting priorities has a bearing on the workplace environment, and ultimately affects the ability of PHNs to establish and maintain relationships with priority perinatal women.

### *Work environment.*

The environment in which PHNs work day-to-day can have a substantial effect on their ability to support breastfeeding with priority perinatal women. Participants in this case study spoke about the challenges of staff shortages and the effect on their workload when they had to cover for absent colleagues. PHN participants recognized that budgets affected staffing levels as well as the availability of supplies and equipment, such as the need for basic communication tools like cell phones. They also commented on how such added stresses had a negative effect on workplace culture, noting the challenges of working with difficult colleagues. At the same time, they noted the positive influences of working with colleagues who had considerable breastfeeding knowledge and skill. Added to this complex work environment were mixed messages from the health authority about directives, with inconsistent lines of communication.

Such workplace challenges have been shown to influence the effectiveness of quality in healthcare settings (Kringos et al., 2015; Tomoiaia-Cotisel et al., 2013). Kringos et al. (2015), in their review of systematic reviews, noted that the context for quality improvement involved factors that had the potential to mediate the effects of interventions, and included such things as organizational resources, data availability, personal skills, and leadership. They also noted that having an understanding of the underlying mechanisms that make an intervention successful helped to improve its effectiveness (Kringos et al., 2015). A number of the contextual factors identified by Kringos et al. were also identified by the PHN participants in this case study, including clear policies, ongoing training, adequate resources including staffing levels, workload, and time constraints. Also noted by Kringos et al., and identified in this case study, were the effects of computerized data infrastructure and the ability to provide credible performance feedback. Not only was breastfeeding feedback not provided to PHNs, but the context of the

workplace environment goes unrecognized and undocumented when it comes to assessing the intended outcomes of PHN service.

*Documentation practices.*

Organizational assistance for PHNs included the tools and directives needed to accurately and consistently document client services. PHN participants noted some organizational direction for documentation, but indicated that they most often relied on each other for directions on what and where to record in iPHIS. Several PHNs mentioned that baby clinic visits were often so hectic that they did not always ask about breastfeeding, particularly after breastfeeding was well established in the early months, and later as the child grew older and was consuming a range of foods. This may be one explanation for why there were very low numbers of both priority and non-priority women breastfeeding at 18 months postpartum. If infant feeding was not assessed by the nurse, then it would not be documented.

In the course of analyzing the breastfeeding data from iPHIS, I noticed a lack of consistency about the way in which breastfeeding was documented by PHNs. Not only did this require some interpretation, but it also indicated that PHNs were not using consistent definitions. One of the values of administrative data is the ability to provide feedback about practice and outcomes, but data quality and consistency need to be monitored to ensure usefulness. Organizational support for clear and consistent assessment and documentation practices could help to improve the measurement of outcomes, which may in turn help the health authority to see where improvements are needed in achieving better outcomes for both the priority perinatal population as well as the general population of new mothers.

*Independent practice.*

Other factors that affect the work that PHNs do with priority perinatal women include

support for independent practice, allowing nurses the autonomy and flexibility to accommodate individual client needs. When nurses are scheduled so tightly that they cannot accommodate a woman's need, or when they are not encouraged to use their own judgement, the organization may inhibit the ability of PHNs to work effectively with priority perinatal women. PHN participants spoke about how they appreciated the ability to plan and provide care according to the needs of each woman, and at the same time valued the autonomy and freedom to work independently with community partners in developing broader systems of support for perinatal women.

***Ecological approaches to breastfeeding outcomes.***

The theory of critical caring recognizes the different ecological levels at which PHNs practice, and PHN participants also identified many ways in which their practice reflected this. The ability to work independently, to be flexible with their time, and to be creative in their approach helped to facilitate the development of trusting relationships at all levels. Briscoe et al. (2016) emphasized the importance of relationships between health professionals and vulnerable women in the perinatal period, and the value of a warm, trusting, and therapeutic relationship, leading to improved self-esteem for women. The establishment and maintenance of trusting relationships is influenced by the organization through formal acknowledgement of its importance in such documents as the Canadian Community Health Nursing Standards of Practice (2011), the provincial Model Core Program paper (2009), the PHN job description (Dubas, 2012), and the health authority practice guidelines (Hill, 2010a, 2010b).

Relationships at all levels are affected by personal initiative, by time, by shifting priorities, and even by the workplace culture that can support good working relationships among staff members, or by not addressing problems. During the course of interviews, PHNs frequently

provided examples of how they had worked with individual women to support breastfeeding. When asked what it was they thought made the difference, every one of the 16 PHNs interviewed spoke about the importance of establishing a trusting relationship with mothers. Although there was acknowledgement that they were not always able to connect with every mother, they believed that it was the formation of those relationships that was essential in supporting breastfeeding success. Such consistent mention of the importance of relationship development is reinforced by the carative health-promoting process of developing and maintaining relationships, as described by the critical caring theory (Falk-Rafael, 2005).

Nurses also spoke about the range of activities they engaged in to help shift the culture of breastfeeding at the community level. Activities such as breastfeeding week celebrations, photo contests and calendar productions, working with pharmacies to offer better breastfeeding related products, or involving the local newspapers to write breastfeeding related articles are examples of some of the activities that PHNs used to help shift community attitudes about breastfeeding. Over the years, time spent on such endeavors was approved and supported by the health authority, although with changing priorities, time for these activities was not always available.

Such endeavors fluctuated over the years, often depending on the interest or enthusiasm of local nurses. Several PHNs spoke about how, despite directives to the contrary, they and their colleagues would make time within their work day, or even on their own time, to initiate or sustain broader community activities. Such successful community activities were also reflective of effective relationships with community partners, and of building community capacity, two of the carative health-promoting processes of the critical caring theory. A method for documenting and tracking the various community and system level activities might help organizations to recognize the effects of such activities over time, and the impact they have on outcomes such as

breastfeeding, tobacco use, or immunizations.

At the systems level, a range of guiding documents emphasized the significance of breastfeeding, and the health authority demonstrated this commitment by establishing and maintaining breastfeeding clinic services at local health units. Such clinics were staffed by experienced and knowledgeable PHNs, who assisted women with a wide range of breastfeeding problems and questions. Both the community and systems level activities that PHNs were involved with were aimed at all perinatal women, recognizing that such universal activities at these levels would benefit priority women in the process. Such community activities and system level changes, unfortunately, are not formally documented, so there is no way to track the effect of changes over time.

The value of individual, community, organizational, and policy support for breastfeeding was identified by Dunn, Kalich, Henning, and Fedrizzi (2015) who looked at barriers and contributors to breastfeeding using the social ecological model. Among other things, barriers identified included lack of family and social support, breastfeeding not being viewed as the norm in communities, and organizational factors such as misinformation and lack of support by healthcare providers (Dunn et al., 2015). Positive contributors, however, included mother's knowledge and confidence, strong social supports, availability of community groups that support breastfeeding, and organizational factors such as the Baby Friendly Hospital Initiative, availability of breast pumps, and supportive and knowledgeable healthcare providers (Dunn et al., 2015). Having workplace policies to support breastfeeding, along with laws about breastfeeding added to the positive contributors at a systems level (Dunn et al., 2015). All of these examples from the literature align with and reflect the kinds of influences that PHN participants spoke about at individual, community, and systems levels, to improve breastfeeding

within their communities.

These activities at the various ecological levels reflect a number of the themes identified through the analysis of interviews and documents. Relationships with individual women, with community partners, and with work colleagues were all highlighted in both positive and negative ways, as was the effect of time. Similarly, supports for PHNs were also mentioned in relation to the level of assistance they received from colleagues regarding knowledge and skill development needed for breastfeeding, as well as educational support from the organization itself. These examples reflect just some of the themes identified in the analysis of interviews and documents. Several of these themes describe factors over which the organization has some control, by causing or allowing various things to happen or not happen, and which could be considered underlying mechanisms ultimately influencing client outcomes.

When nurses' accounts of fluctuating organizational influences are placed alongside the statistical findings of breastfeeding outcomes, a much broader understanding is presented. Although it is not possible to attribute these organizational influences directly to the outcomes, it does bring to light the kinds of things that health care leaders can do to support the achievement of higher breastfeeding rates. During this study period, and in this particular group of local health areas, breastfeeding outcomes for priority perinatal women, who had received additional and ongoing contact with PHNs, were better than that which the current research would have us expect. PHNs seemed to successfully navigate the many complex organizational influences affecting their work with priority perinatal women to improve initiation and duration of breastfeeding. Unfortunately, the same cannot be said for tobacco cessation.

### **Household tobacco use.**

In this case study, statistical results for household tobacco use at 18 or more months revealed

that there was a significant difference between the priority and non-priority groups, with children in the priority group having a much higher rate of exposure to household tobacco. This is not a surprising finding given that the priority population identified in this case study are often those disadvantaged by low income, low education, and mental health issues, and who are less likely to quit smoking during pregnancy, and more likely to relapse if they do quit (U.S. Department of Health and Human Services, 2014). At 18 months after the birth of their children, the priority group had a household tobacco use rate of 29.8 percent, that is 106 children exposed to tobacco, while the non-priority group was considerably lower at 16.1 percent, or 396 children. During the time frame of this study, Perinatal Services BC (2015a) reported that the rate of smoking during pregnancy for this health authority ranged between 12 and 14 per 100 deliveries. By general comparison, the overall smoking rate for the whole population in BC in 2011 was 15.8 percent, and across Canada the 2011 rate for women who smoked was 17.5 percent (Statistics Canada, 2013).

Both provincial and health authority guiding documents for PHNs identified smoking as a risk factor, and offered various approaches to supporting cessation. In this health authority, data for household tobacco use was obtained through discussions with parents at routine immunization clinic visits. A section of the iPHIS early childhood record identified as *local study* was used to record any indication of household tobacco use. Based on my involvement with the health authority at that time, I can clarify that this approach was based on the theory of change as developed by Prochaska and DiClemente (1985), with the idea that repeated inquiry by PHNs about tobacco use might help to shift attitudes towards cessation.

The data gathered from the iPHIS records revealed a wide range of documented responses to a changing range of questions. Once these data were interpreted and cleaned, it also became

apparent that the frequency of assessments of tobacco use diminished over time, even though assessments were intended to be done at each clinic visit. Based on the administrative data collected for this study, household tobacco rates for priority children across the three geographically separate communities ranged from a low of 2.8 percent to a high of 60.5 percent. Among the non-priority families, the range was 3.4 percent from the same low community, to a high of 47.4 percent from the same high community. Without available data on local community rates of smoking it is difficult to know what the community norms were. However, this wide range of figures could be related to the frequency of assessment by PHNs, resulting in lower apparent numbers when household tobacco use was not assessed, and therefore not documented. This is evidenced by the total number of priority and non-priority households included in the 18 month figures cited earlier. PHN participants often mentioned the very busy nature of immunization clinics, and how there were other priorities to attend to in the limited time available for each family. Several nurses also remarked on their discomfort in repeatedly asking about tobacco use, feeling that they were harassing families, or that they were making them feel guilty. These factors may reflect some of the carative health-promoting processes of the critical caring theory (Falk-Rafael, 2005), showing how PHNs recognized the awkwardness of the inquiry, and chose not to ask about tobacco in favour of maintaining a good relationship. Such an approach also demonstrates a reflexive approach to caring, especially when women had shared prior knowledge of smoking habits.

Although PHNs were asked to collect household tobacco use information, I know from my experience in this health authority, that during the time frame of the study routine reporting of these trends was not provided to the staff. If tobacco cessation among a portion of the population with generally higher rates of smoking is an important issue for PHNs to address, then tracking

those rates might be a good first step. Such tracking of overall rates of tobacco use at the community level might also serve to reflect the impact of longer term community level activities aimed at tobacco prevention. My review of the raw data collected in the iPHIS record revealed considerable inconsistency in the nature of the questions asked, and in the nature of the information documented. If healthcare organizations want to know whether PHNs are making a difference with tobacco cessation, then a better approach to documentation and reporting needs to be established.

Although some successes have been noted with smoking cessation during pregnancy, it has been more of a challenge to prevent relapse in the postpartum period (Flemming, Graham, Heirs, Fox, & Sowden, 2012; Su & Buttenheim, 2014). Some researchers have found that interventions need to address the contextual factors in a woman's life, including the influence of other smokers in the home (Flemming, Graham, Heirs, Fox, & Sowden, 2012; Su & Buttenheim, 2014). The Family Nurse Partnership introduced in England, based on the Nurse-Family Partnership program in the US found, after nine months, that there were no effects compared to the usual care for smoking cessation despite intensive involvement by specially trained nurses (Robling et al., 2015). Other studies however, have shown more promising results when it comes to effective approaches for smoking cessation (Azulay Chertok & Hayes Archer, 2015; Bailey, 2015; Chamberlain et al., 2017). Many published studies have focused on the prenatal period with assessment of cessation at delivery, but given that ongoing household smoking can have an influence on infants it makes sense that similar approaches could easily be continued in the postnatal period with all family members when there is ongoing PHN contact.

A Cochrane review of interventions for supporting pregnant women found that psychosocial interventions and counselling increased the numbers of women who stopped smoking

(Chamberlain et al., 2017). A prenatal smoking intervention program used in Tennessee, using an expanded version of the 5 A's program over four visits found 28% of the intervention group quit smoking by delivery (Bailey, 2015). This intervention was delivered by trained health educators in an office setting and included assistance with practical needs, such as food, housing, and transportation.

The 5 A's prenatal smoking cessation program has been shown to be an effective tool for nurses who receive training in the program (Azulay Chertok & Hayes Archer, 2015). This evidence based program, promoted by the American College of Obstetricians and Gynecologists, is a smoking cessation intervention that involves routinely reviewing tobacco use through five steps (ask, advise, assess, assist, and arrange) with pregnant women at each prenatal encounter (American College of Obstetricians & Gynecologists, 2015). Although primarily used for women in the prenatal period, the approach could be used throughout the pre- and postnatal period when PHNs provide ongoing contact for priority perinatal women. The 5 A's is a strategy that was listed in the health authority practice guideline for support for priority perinatal populations (Hill, 2010a, 2010b) included in this study, but was not identified by PHN participants as one they were familiar with, and not one in which they had received any formal training.

Despite the range of interventions available to health care professionals, there are a number of barriers and facilitators that can influence effectiveness. Flemming et al. (2013), in a systematic review of qualitative research exploring the context of women's circumstances influencing smoking behaviour in pregnancy, found that the influence of partners, family, and friends who were also smokers was an important factor in a woman's intention to quit permanently. Assessing the dynamics of the role of smoking in the household is an essential

component for health professionals when helping women with cessation (Flemming et al., 2013). In another systematic review of qualitative research examining the perceptions of health professionals in everyday practice, Flemming et al., (2016) found that organizational context and professionals' roles affected their ability to support smoking cessation. One of the key facilitators was the establishment of a trusting relationship between the professional and the woman, as was the level of skill and knowledge on the part of the professional (Flemming et al., 2016). Clear organizational policies and the availability of continuing professional education related to smoking cessation were also seen as facilitators, while some of the barriers included organizational constraints, such as time pressures and procedures that led to a 'tick box' approach (Flemming et al., 2016).

***Organizational factors affecting tobacco outcomes.***

Many of the organizational factors identified by PHN participants in this case study related to tobacco outcomes are similar to those identified for breastfeeding and immunizations, and include aspects related to PHN supports, shifting priorities, work environments, documentation practices, and the independent nature of PHN practice. Rather than repeating them here, factors relating more specifically to tobacco, which surfaced during the interviews with PHNs, are described in this section.

PHNs interviewed for this case study indicated a lack of clarity about the role they were expected to take in relation to tobacco prevention and cessation activities, and more specifically around assessment and documentation. Unlike immunizations, PHNs were vague about how they approached issues of cessation. They reported that they tended to seek out tobacco cessation resources on their own, because they were not aware of any established guidelines from the health authority. To learn about the best approach to take with tobacco reduction or

cessation, nurses also mentioned how frequently they turned to their work colleagues for help with their practice, including what to assess and how to document. Similarly, several PHNs noted a lack of health authority sponsored education regarding both prevention and cessation activities for PHNs working with individuals and with community partners.

*Ecological approaches to tobacco outcomes.*

PHN activities at the individual level tend to be more focused on cessation. When asked how they would support priority perinatal families in their cessation efforts, most PHNs indicated they would offer a range of on-line or phone-based resources that parents might investigate, such as the QuitNow phone line, but they did not describe any specific measures they would have provided directly. With concerns about the exposure of small children to second hand smoke, it is surprising that PHNs, who are so involved with priority families, did not have more direction, education and resources from the health authority.

One such resource might be the distribution of nicotine replacement therapy, which is available free in BC from pharmacies (QuitNow.ca, 2017). One PHN observed, however, that while PHNs are permitted to provide immunizations, birth control, and antibiotics, they were not able to distribute the nicotine replacement patch independently. Picking up the free patch at the pharmacy may seem straightforward to many people, but just one more trip to town with several small children in tow, and no means of transportation might be more than some priority families can manage. Although it is still viewed with some uncertainty, nicotine replacement therapy has been suggested as one effective way to approach tobacco cessation, and is considered to be safer than continued smoking in pregnancy or while breastfeeding (Gould, Bittoun, & Clarke, 2014; Ilett et al., 2003). As with other specific treatments, such as for sexually transmitted infections, nicotine replacement could be established as a certified practice provided by PHNs.

PHNs contribute to the establishment of supportive and sustainable communities through a range of prevention oriented activities over time. Several nurses mentioned the ongoing school programs in which they had been involved, some that had lasted for years, helping to shift the perceptions of youth about tobacco. Although such activities are not directly focused on priority perinatal families, they help to change the local culture of smoking. If young people do not take up smoking in their teen years, they are less likely to become smokers later in life (Statistics Canada, 2013), and therefore less likely to become parents who smoke.

PHNs interviewed for this study had many years of experience, and spoke about a range of tobacco prevention and cessation approaches at both the individual and community levels that came and went over time. Their words often reflected their respect for clients, recognizing that at times smoking cessation was not a priority for the family, and that it might have been the only source of stress relief for some living in very difficult conditions. Such attitudes reflect a systematic approach to caring, and an understanding of an individualized approach to teaching and learning. This is exemplified by one PHN who, recognizing the challenges in dealing with an addiction, commented that she felt they had achieved success by having more parents smoke outside and use smoking jackets to reduce children's exposure to second hand smoke. This kind of approach not only maintains a good working relationship with priority families, but also contributes to a sustainable environment for families.

Given the trusting relationships that PHNs established with priority families, it seems that effectively addressing tobacco cessation is a missed opportunity for this healthcare organization. This is somewhat surprising given that the province's Model Core Program for Reproductive Health notes that health authorities need to play a leadership role in the "design and promotion of programs for tobacco cessation ... to enhance responsiveness to reproductive health needs and

issues” (p.18, 2009). This document goes on to identify the need for education and counselling around tobacco use for vulnerable and low income women in the perinatal period (BC Ministry of Healthy Living, & Sport. (2009). PHN participants identified several organizational factors that negatively influenced the success of tobacco reduction strategies including shifting priorities, lack of PHN training about tobacco cessation, and inconsistent documentation practices. Added to that is the continuity of organizational direction and support for PHNs over time, working at both individual and community levels, contributing to tobacco reduction at the population level. The addiction to tobacco is clearly a difficult challenge. Providing clear organizational guidelines and expectations for both prevention and smoking cessation, as well as providing educational resources and supports to PHNs would be important first steps, especially considering the frequent encounters nurses had with priority families, and the trusting relationships that were established.

### **Infant immunizations.**

In this case study, immunization rates were assessed based on the number of children who had completed their basic series by the time they turned two years old. In British Columbia immunizations rates for two-year-old children born in 2009 range from 67 percent in some health authorities to 70 percent in others (BC Centre for Disease Control, 2017). Over the two-year period in this case study, immunization rates for the non-priority population of children across the three local health areas were 77 percent, for 1870 children. The rate for children in the priority group was 80.8 percent, for 287 children. This is a noteworthy finding given the average immunization rates in BC. Although rates among the two groups were not significantly different, it is interesting that the priority children in this study achieved slightly higher immunization rates, given that the research literature has indicated that they are less likely to be

immunized (Kim et al., 2007; Luman et al., 2003; Public Health Agency of Canada, 2003).

The findings of this study would likely come as no surprise to PHNs involved with priority families. Throughout the interviews there were many stories revealing how nurses worked hard to ensure priority families could get immunized. From securing funding for transportation, to making time for families that dropped by the office unexpectedly, to immunizing at home visits, PHNs were flexible and creative in their approaches to support priority families. PHNs recognized the value of personal connections when they phoned families to remind and arrange appointments for children who were behind, taking the initiative to do this, often on their own time in the evening to make sure they reached parents when they were at home. PHNs noted how such personal phone conversations provided an opportunity to answer parents' questions and provide information about the importance of vaccines.

The findings of this case study are supported by a recent Canadian study, the Families First home visiting program in Manitoba, which showed higher complete vaccination rates for children at one year and at two years of age compared to those not involved in the program (Isaac et al., 2015). This program involved an average of two visits per month over a period of 18 months for children who had at least three risk factors identified on newborn screening. Such research supports findings from this case study where a higher proportion of priority children were fully immunized at 18 months compared to non-priority children.

Findings from both of these studies resonate with those of a Cochrane review of parents and informal care givers' views of communication about routine childhood immunizations (Ames, Glenton, & Lewin, 2017). This review found that parents wanted more and balanced information about risks and benefits of immunizations, and they wanted information to be available well before each immunization appointment (Ames, Glenton, & Lewin, 2017). Parents

also noted that negative relationships and poor communication with health care workers had an important effect on decisions to immunize (Ames, Glenton, & Lewin, 2017). When PHNs are involved with priority families on a long-term basis, and have developed trusting relationships, they have a good opportunity to provide information and respond to concerns about childhood immunizations.

***Organizational factors influencing immunization outcomes.***

As with breastfeeding and tobacco outcomes, there were many similar organizational factors that affected the ability of PHNs to support priority perinatal women in getting their children immunized. Factors relating to the work environment and the independent practice of PHNs were fairly consistent across all three outcomes, however, there were some differences when it came to immunizations.

The PHNs in this study identified immunizations as a priority in their work, and they described significant organizational supports to ensure a high level of service. They had assistance from the medical health officer and the BC Centre for Disease Control to deal with problems and unusual circumstances. They also had the expertise of colleagues to deal with a wide range of immunization related issues, from cold chain management to adverse reactions. From my experience working in this health authority, I know that documentation practices for recording immunizations in iPHIS were clearly outlined by the province during the period of data collection. The BC Centre for Disease Control provides detailed direction for all aspects of immunization through its on-line immunization manual (BC Centre for Disease Control, 2016). They also provided a required on-line tutorial for PHNs to learn about the many aspects of providing safe and effective immunizations.

PHNs had clear direction and support from the health authority to deliver a safe and effective

vaccine program. Given their close relationships with priority families, the focus on immunizations was naturally a part of the discussions between PHNs and families. Contrary to expectations from the research literature, priority families in this health authority completed the basic immunization series for their children at the same rate as the non-priority families, if not slightly better. PHN participants described many ways in which the immunization program in this health authority was supported with time, continuity, resources, education, a supportive workplace environment, flexibility, and consistent documentation practices. In their work to improve immunization rates with priority families, PHNs described the carative health-promoting processes (Falk-Rafael, 2005) of maintaining relationships, using a reflexive approach to caring, and careful consideration of the teaching learning process.

Throughout the interview process, PHNs recounted a variety of issues that influenced their ability to establish relationships and work closely with priority families to support breastfeeding, tobacco reduction, and immunizations. The themes that surfaced through the analysis of the interviews and the review of guiding documents, have led to recognition of several underlying factors within the organization that may have a bearing on the achievement of those desired health outcomes.

### **Underlying Mechanisms**

From a critical realist perspective, the goal of research is to look for the causes of phenomena in a continuously changing social structure, and to search for deeper levels of comprehension and explanation (Appleton & King, 2002; McEvoy & Richards, 2006; Wainwright, 1997). In critical realism ontology is seen as stratified domains of reality: the empirical, the actual, and the real (Bhaskar, 1998b). This case study has explored three outcomes of PHN service, along with the organizational context in which this service was provided. Quantitative data related to

breastfeeding, immunizations, and tobacco has been gathered that demonstrates observed reality at the empirical domain. Themes have been generated from interviews and documents that reflect elements of the actual domain. Some of these themes, such as PHN supports or shifting priorities, reflect a level of reality that is not always directly observed or experienced, but which nonetheless has an influence on the practice of PHNs. Underlying structures, mechanisms, relations, and powers at the real domain (Wainwright, 1997) also have an impact on the ability of PHNs to work with priority perinatal women. Bhaskar (2008) explained that real structures and mechanisms are not visible, they exist and act independently of our experience of them, and under certain conditions events are generated, which we are then able to observe and experience. From a critical realist perspective, it is these underlying structures, mechanisms, relations, and powers, which influence the achievement of desired outcomes, that I consider next.

In this case study, I sought to explore the underlying elements within the organizational setting that facilitated the ability of PHNs to support priority perinatal women in achieving the three outcomes of interest. After considering all the statistical data, the words and experiences of PHNs, the various guiding documents, and some of my personal experiences, I have identified several underlying factors within the organizational context that I believe had an influence on PHN practice with priority perinatal women. I have described these as: shared vision and priorities; continuity; workplace culture; and PHN capacity. Each of these are discussed further in the next section.

### **Shared vision and priorities.**

Achieving certain outcomes, such as breastfeeding, immunizations, or tobacco reduction, requires considerable time, planning, and resources to make a difference at individual, community, and population levels. Although the structures to deliver a program may be in place,

such as facilities and staffing, the organizational vision, priorities, and direction, need to be established, communicated, and maintained over time (Underwood et al., 2009). Nurses interviewed for this study spoke repeatedly about how it was understood that immunizations took priority over everything else. Visits to priority perinatal women would be delayed or rescheduled if necessary to make sure that immunization clinics were fully staffed. At the same time, PHNs took advantage of unexpected visits with priority families to bring immunizations up to date. Evidence-based vaccine information and immunization policies were readily available and updated routinely. I know from my experience in this health authority during the time of this study that supplies and equipment for the immunization program were never in short supply. Documentation of individual vaccines was carefully done according to provincial standards, and was routinely monitored to provide feedback about population levels of coverage. All the component parts of the system were in place to support immunizations for children. People within the organization seemed to understand the importance and priority of the immunization program. The immunization outcomes for priority perinatal women show the effect of this vision, which was well established within the organization.

The recognized priority of the immunization program stands in marked contrast to supports for tobacco prevention and cessation efforts. Guiding documents offered limited resources, often without much depth, instead referring PHNs to a range of other public organizations. PHNs spoke about how they would search out information on their own through visiting the local Cancer Society, finding on-line information, or searching the available research literature, and how they would provide an array of websites, phone numbers, or printed material to individuals. Household tobacco use was documented at immunization clinics, but was never compiled to provide feedback. In one area, a district wide elementary school-based tobacco prevention

program was established to shift attitudes about smoking, and prevent the initiation of smoking in the teen years (Hill, Beaton, Graczyk, Stott, & Yablonski, 2013), but research and evaluation resources were not available to assess its effectiveness.

PHN participants in this study noted that the organization did not provide clear and ongoing policy direction or educational support about tobacco prevention or cessation for PHNs working at the individual or community levels. Although this health authority recognized the importance of tobacco with a separate department for tobacco enforcement, it seems that PHN activities with individual families, or at broader community levels were not supported in the same way that the immunization program was. The limited long-term vision and degree of priority given to tobacco prevention and cessation may be one of the underlying factors influencing household tobacco outcomes in this study.

The degree of organizational vision and priority for breastfeeding seemed to fall somewhere between these two examples. Guiding documents provided more specific direction about the importance of supporting breastfeeding initiation and duration. PHNs mentioned that breastfeeding education was more prevalent, although it wavered over time. Some PHNs took the personal initiative to improve their own level of skill and knowledge by becoming certified lactation consultants, or by teaching breastfeeding courses. In my experience as a manager, budget was available to purchase supplies and equipment to support breastfeeding mothers in need. The PHNs in this study clearly indicated that breastfeeding was a significant priority in their work. They also noted, however, that higher levels of management did not always view breastfeeding with the same priority that nurses did. The perspective of managers would have made an important contribution to this discussion however, although they were invited to participate in this study, there was no representation from those at the management level.

Each of these three health goals were regarded with different levels of priority, and the structural supports available to each program seemed to reflect the importance of the long-term vision and the priority ascribed by the organization. When organizational vision was clear, present, and consistent over time it seemed to infuse the PHNs with a strong foundation and sense of priority. When it was missing, nurses reflected that services seemed to become diluted and inconsistent over time. I believe that the underlying mechanism of shared vision and priorities operates in conjunction with other underlying mechanisms within the healthcare organization. The complex interaction of several underlying mechanisms that overlap can have substantial effects on the outcomes PHNs try to achieve with priority perinatal women.

**Continuity.**

A second underlying mechanism that seems to have a bearing on the organizational factors that affect the ability of PHNs to support priority perinatal women is that of continuity; continuity of services, people, and relationships over time. Organizations have the ability to change service priorities, to maintain or change programs, to shift work assignments for PHNs, to provide time and resources for community level endeavors, or not. PHNs noted that the continuity of service was disrupted when changes happened frequently.

Nurses in this study repeatedly mentioned the importance of relationships, and how those relationships with priority women took time to establish and maintain, how they were sometimes disrupted when families moved to another nursing district, or when PHNs were assigned to different programs. PHNs often relied on relationships with community partners when they were involved in community level activities, such as breastfeeding week events. They explained how community members and service partners also came to depend on various PHN programs and services, where relationships had been established and strengthened over time. The continuity of

those relationships was identified by PHNs as being essential to successful outcomes.

In this case study, several PHNs mentioned the effect of recent changes in their health authority, and how they felt that some changes had had a detrimental effect on breastfeeding rates because the continuity of various individual and community level activities designed to support breastfeeding had declined. Continuity, or the lack thereof, not only affects services for individual priority families, but also influences the level of skill and knowledge that PHNs acquire over time through experience, as well as from ongoing educational support for PHNs. The immunization program in this health authority exhibited tremendous continuity over time, and immunization outcomes for the priority families reflect this. With less support from the organization, the continuity of tobacco prevention and cessation supports changing over time may be part of the reason why outcomes in this area were not impressive. Disruption in the continuity of services, without clear justification, was often met with negative feedback from the community, as well as from PHN staff. Changes in direction, in work assignments, in priorities and supports for PHNs were identified by PHNs as having an impact on the work environment. This in turn, links to the kind of supports available for PHNs working with priority perinatal women.

### **Workplace culture.**

As an underlying mechanism, the day-to-day workplace culture can have a considerable bearing on the effectiveness of PHN practice. The local office culture is influenced by relationships among nurses and other staff members. PHNs interviewed often mentioned how they turned to work colleagues for advice, direction, and support. They appreciated and depended on their colleagues' knowledge and expertise in areas that were unfamiliar to them. The PHNs interviewed for this case study were all experienced nurses, but spoke about how they

still relied on coworkers for consultation, as well as for practical support when dealing with individuals or with community level activities. Events like breastfeeding week involve many PHNs to engage community partners, to set up venues, and to host events. The workplace culture is also affected by staffing levels and workload expectations, by clear communications, and by tangible resources needed to safely and efficiently complete the work expected. When budgets are tight, and staffing is short, or communication lines get tangled, pressures may emerge and the local culture can be quickly pulled down by the informal organization within that setting.

Barnard (1938/1968) discusses the influence of the informal organization in his seminal work on administration in the workplace. Relationships within an office are not governed by the formal organization, and may quickly change from friendly to hostile, and as a result may change the experience, knowledge, emotions, and attitudes of those involved (Barnard, 1938/1968). Informal organizations exercise control within the formal organization by establishing communication lines, maintaining cohesiveness, a sense of personal integrity, independent choice, and self-respect among its members (Barnard, 1938/1968). As a manager within the healthcare organization I have seen both the positive and negative influences of the informal organization on workplace culture, as did some of the PHNs interviewed for this study.

When there is discord among PHNs, for whatever reason, it can impair their ability to work together to achieve their intended goals. This issue was raised in the interviews, with the observation that difficult coworkers directly affect other PHNs, as well as the priority clients that they serve. Although such situations are challenging to deal with, and may not always be completely resolved, the organization plays a role in addressing the situation, successfully or otherwise. Relationships among PHNs influence the nature of support they receive from each

other, which in turn shapes their knowledge and skill, and ultimately may affect their ability to resolve breastfeeding problems with individual women, to immunize children safely, or to work effectively with priority perinatal women. This finding aligns with Underwood et al. (2009) who found that collaborative team relationships were important to effective PHN work.

### **PHN Capacity.**

The capacity of individual PHNs to manage within a complex health care organization is different for every nurse. History, experiences, family background, culture and traditions all influence an individual's perspective (Grassley & Nelms, 2008). Novice PHNs bring their anxiety, their interest, and their limited perceptual abilities and job experience (SmithBattle, Diekemper, & Leander, 2004). The experienced PHNs interviewed for this study demonstrated their interest and enthusiasm for their work through the many examples they provided. In my experience as a manager, however, I know that not every nurse enjoyed their work in the same way. Some nurses preferred working with more structured programs, such as communicable disease follow-up. Other nurses, novice or experienced, brought energy and passion to their work with priority perinatal women. They used initiative to find ways of supporting families, and they were flexible in their approach to develop and maintain relationships with women, and with community partners.

The concept of PHN capacity is linked to the ability of individual PHNs and their local teams to take initiative in addressing various challenges related to the achievement of the three outcomes of interest. Working with individuals and communities requires a high level of autonomy, and is an expectation of community health nurses (Community Health Nurses of Canada, 2011). PHNs in this case study frequently mentioned the frustrating effect of more recent organizational changes in perinatal services, which limits their autonomy by restricting the

availability of postnatal services for the broader population of women. The ability to work independently with individuals, communities and systems helps to improve the health of the population (Olson-Keller et al., 2004). Such work requires initiative, flexibility, and creativity when it comes to dealing with the unique needs of individuals and communities to build community capacity and develop supportive and sustainable environments, which are two of the key components of the critical caring theory upon which public health nursing is based (Falk-Rafael, 2005; Falk-Rafael & Betker, 2012a). PHN capacity also relates directly to the first carative health-promoting process of preparing self, which involves life experiences, as well as continuing education and skill building, particularly around such topics as communication and conflict resolution skills, leadership and political awareness (Falk-Rafael & Betker, 2012a).

Nurses may bring their personal resources with them, but the organization can have a significant effect on how they are supported and encouraged, or not. A supportive and encouraging work environment helps to build the capacity of PHNs in much the same way that the Canadian Community Health Nursing Standard of Practice discusses the importance of building capacity at the individual and community levels, by building on strengths, increasing skills, knowledge, and willingness to act (Community Health Nurses of Canada, 2011). PHNs in this case study spoke about the level of education and training provided by the organization, such as motivational interviewing, and for some specialty areas such as immunizations and breastfeeding, but less so for tobacco prevention and cessation. They spoke about recent changes in perinatal services that they felt would disrupt the continuity of engagement with the community. They spoke about the lack of resources to support families, and the increased time pressures when staffing was short. They also spoke about taking breastfeeding courses on their own time and dollar, and becoming certified lactation consultants to better support new mothers.

Despite these challenges, nurses described how they could work around the system, still following formal guidelines, but by being flexible and creative in their approach they were able to meet the needs of their families.

Confidence, initiative, and flexibility, helped PHNs to work within the structure of the organization to continue supporting priority perinatal families in creative ways that worked for them. Building the capacity of PHNs is one of the underlying mechanisms that influences their ability to support priority women in achieving the desired outcomes. One implication is that PHNs who have a high level of autonomy and can operate independently are able to work around the various challenges encountered within the ongoing life of a very large healthcare organization. To enable PHNs to develop the necessary relationships with individuals and with communities to achieve the desired outcomes for breastfeeding, tobacco reduction, and childhood immunizations, the healthcare organization needs to recognize the importance of building PHN capacity, supporting a positive workplace culture, and maintaining the continuity of a shared vision and priorities (Underwood et al., 2009).

One of the goals of this case study was to look for the causes of events that influenced the ability of PHNs to support priority perinatal women in the complex and continuously changing social structure of this healthcare organization. Using a critical realist perspective, I sought a deeper level of understand and explanation about the underlying mechanisms within the organization that might influence the outcomes PHNs were trying to achieve. Although there may be many more, these four underlying mechanisms emerged from the thematic analysis of PHN interviews and guiding documents, as well as from some of my own personal experiences. The organization has some degree of control over the structural supports for services and staff, the continuity of services, the workplace culture, and the building of PHN capacity. However, it

became apparent through the course of this investigation that by using flexibility, creativity, and independence, as well as communication skills, leadership, and political awareness, PHNs have managed to successfully navigate the many challenges and complexities of the healthcare organization.

### **Contribution to Nursing Knowledge**

There are two main areas in which I believe this case study has contributed to nursing knowledge. One is the verification and extension of the critical caring theory used to guide this research. The other is the finding that routine PHN practice in this health authority can improve the breastfeeding and immunization rates for priority perinatal families. Discussion of the theory first paves the way for consideration of the results of this mixed methods case study.

#### **Verification and extension of critical caring.**

Falk-Rafael's (2005) critical caring theory for guiding PHN practice formed the theoretical framework for this case study. The themes identified from interviews and documents provided many examples of the ways in which PHNs practice with individuals, groups, and communities, and which reflect the seven carative health-promoting processes of this theory. The importance of relationships was identified by every one of the PHN participants, and was highlighted in many of the guiding documents. The PHNs involved in this case study spoke at length about the importance of relationships not only with individual priority perinatal women, but also with groups and community partners such as teachers, social workers, and other service providers, as well as the community at large. It also became apparent through the conversations with PHNs that relationships among themselves, as a group of coworkers, influenced the effectiveness of their team, and consequently their ability to support clients.

These relationships with other PHNs were important in providing ongoing support,

consultation, education, and skill development. Nurses bring with them a range of life experiences and skills that help to prepare them for the relationships they encounter, but nurses new to public health have a lot to learn about the nature of PHN practice, and need to rely on colleagues to help develop their expertise. The nurses in this study recognized the importance of being prepared with the necessary knowledge and skill to work independently, appreciating the educational opportunities from the healthcare organization, but also taking the initiative to seek further education on their own. Not only did nurses recognize the value of teaching and learning among themselves, but the PHNs interviewed for this study often mentioned the need to tailor their educational approaches to the unique needs of their clients. By focusing their efforts at multiple ecological levels, PHNs talked about how they worked to support individuals, groups, and the broader community. The combination of culturally sensitive support for individuals and communities helps to build the capacity of communities and to assist in the creation of sustainable environments. All the carative health-promoting processes of the critical caring theory were reflected in, and verified by the words and experiences of this group of PHNs.

The PHNs in this case study illustrated an additional component that I believe extends the critical caring theory, and that is the process of *navigating organizational complexity*. PHNs practice within a healthcare organization by virtue of their employment agreement. As such, there are organizational policies and procedures they are expected to follow. All the nurses interviewed for this case study were very experienced PHNs. They had an understanding of what they knew could and should be done because of their years of experience. They knew how to work within the system, and knew where they could safely bend the rules to do what they needed to do to support priority families. Whether it was immunizing children in the home, or bringing along a few groceries, or staying late to sort out breastfeeding difficulties, PHNs learned

how to navigate the complex context of union agreements, health authority policies, and local workplace expectations to establish and maintain trusting relationships.

Contextual factors are an important consideration in health care, but are rarely recorded or analyzed (Tomoaia-Cotisel et al., 2013). Tomoaia-Cotisel et al. (2013) conducted a retrospective study of 14 research articles to identify the most important elements that could affect interpretation of research findings. They identified contextual factors at the practice level, such as characteristics of the clients and healthcare providers, and organizational level contextual factors, such as leadership structure and character, contractual arrangements, and degree of formal integration of care processes. At the external environment level, they identified contextual factors such as political authority, financing, and coordination with community. Cross cutting themes included operational changes, such as new roles, new employees, and communication strategies (Tomoaia-Cotisel et al., 2013). This brief summary reflects a range of contextual factors that are often not recognized or captured in traditional research projects, but which can have some bearing on the results. Many of these factors are similar to the themes identified in this case study, and which were described by PHNs in the examples they gave.

In reporting the findings of their study pertaining to the ethics of caring within the critical caring theory, Falk-Rafael and Betker (2012b) discussed how PHNs at times experienced moral distress and barriers to social justice due to organizational constraints. This included such things as government imposed changes, structural reorganizations, changing scope of practice, and work reassignments within the health care agency resulting in decreased resources and increased workloads, which limited the ability of PHNs to do political advocacy work (Falk-Rafael & Betker, 2012b). They described how, in response, PHNs sometimes worked around those issues, for example, by working on their own time (Falk-Rafael & Betker, 2012b). Falk-Rafael (2000a)

describes “judicious circumvention” as one way in which PHNs resist changes in the workplace by avoiding certain duties, or using professional judgement rather than following directives in order to maintain relationships with clients and communities.

During the interviews for this case study, PHNs spoke about how they navigated similar changing contextual influences, how they managed heavy workloads with other program demands, how they took the initiative to educate themselves, to encourage each other to document carefully and consistently, how they worked with the system to try to improve the next generation of public health information systems, or how they worked around challenging co-workers. They spoke about finding funding for transportation, immunizing families who dropped into the office unexpectedly, establishing tobacco prevention education programs across the community, and working weekends on their own time to host community breastfeeding events. Although not always linked with moral distress, or resistance to change, PHNs in this study described a range of things they did to work around organizational constraints or expectations to find ways to more effectively support families and communities. These are just a few of the many examples PHNs gave to explain how they maneuvered within the health care system to achieve intended outcomes. Both the statistical outcomes and the interview data from this case study demonstrate how navigating the organization enabled PHNs to continue providing many of the necessary services and supports for breastfeeding, infant immunizations, and tobacco reduction.

This extension to the critical caring theory offers another element to the framework that provides guidance for public health nursing practice by adding another tool of resistance in dealing with political and administrative pressures, and by providing a way to exercise more control and autonomy within the scope of practice of PHNs (Falk-Rafael & Betker, 2012a). It is

my belief that the ability to navigate the many contextual complexities of the health care organization enables PHNs to work more effectively with individuals, groups, and communities to make a difference in health outcomes.

**PHNs make a positive difference.**

This case study used administrative data from routine PHN client documentation in iPHIS to show that priority perinatal women, who received five or more postnatal contacts from PHNs, initiated breastfeeding in much higher proportions than expected, and continued breastfeeding for longer than expected. It also shows that children of priority women were immunized in a higher proportion, although not significantly different, than non-priority children, again contrary to expectations.

This case study differs from other research projects in several respects. This retrospective project utilized administrative data based on routine PHN charting over a period of four years. It compared three key outcomes between 341 priority women and 2344 non-priority women in three communities. The determination of priority status in this study was based on women who received five or more postnatal contacts with PHNs. It was the usual practice of PHNs in this health authority to determine, on a case-by-case basis, which mothers needed additional and ongoing follow-up, and to offer that support to women who voluntarily accepted those services. These women, who were negatively affected by the social determinants of health, included both primips and multips, women of any age, any educational level, and any income level. The nature of the services provided to these priority perinatal women was based on their individual needs, and was not a part of a standardized or structured program, although general direction was provided to PHNs through guiding documents such as practice guidelines (Hill, 2010a, 2010b). The PHNs providing services to priority women had a variety of other workload expectations

and priorities, such as immunization clinics, communicable disease follow-up, or school health, and worked at individual, group, and community levels to promote the health of the larger population. These PHNs had a wide range of knowledge and skill, and received no specialized training for their work with priority perinatal women.

Many of the studies reviewed for this project limited the characteristics of the women involved, such as the Nurse-Family Partnership studies (Kitzman et al., 1997; Olds et al., 1999) where only primiparous women under a certain age and income level were followed. Some of the studies suggesting PHNs did not make a difference in outcomes were based on a short time frame, such as Armstrong et al. (2000) who found no improvement in immunizations after four months, or Quinlivan et al. (2003) who found no difference in breastfeeding rates by six months postpartum. However, some studies reported longer durations of breastfeeding when nurses followed mothers for 24 months or more (Kemp et al., 2011; Kitman et al., 1997), and better immunization rates where nurses were involved for at least 12 months (Koniak-Griffin et al., 2002; Isaac et al., 2015), which support the findings of this case study. Although similar results were found with the successful Nurse-Family Partnership program (Olds, 2006), the program was directed at a subset of priority perinatal women and had established a structure of increased support for PHNs through intensive training, closer supervision, and smaller caseloads. As a manager in this health authority during the timeframe of this case study, I know that such levels of PHN support were not the norm for nurses, so it was promising to see similar results. I was unable to find in the recent research literature any studies focusing on these three outcomes of interest and using administrative data that involved a broad range of priority women with PHNs in daily practice, over a longer period of time.

The results of this case study reflect the everyday, ongoing practice of PHNs over a period of four years in one health authority. During this time, no one was aware that their actions might become a part of a research project. There was no extra funding, no special training, and no reduction of PHN caseloads to support the delivery of this service. PHNs in this health authority demonstrated that they made a difference with priority perinatal women, and this, I believe, makes a valuable contribution to nursing knowledge.

### **Limitations of this Case Study**

There were several limitations identified during the course of this case study, starting with the use of administrative data from the integrated public health information system. Administrative data were used to measure three key outcomes of interest among priority and non-priority families receiving public health nursing services. These data were based on the routine documentation practices that PHNs used to record encounters and services provided to all individuals they worked with. Although such data were not designed to be used for research purposes, they do provide a body of information that can be used to assess some aspects of PHN services. Issues of data quality and consistency were noted particularly in the areas of breastfeeding and household tobacco use. It was assumed that missing data was a result of assessments not done by PHNs, with the result that there was less data recorded for each family, as time progressed. This is not an unexpected aspect of PHN practice, but the use of this body of administrative data to assess longer term outcomes was limited.

Another limitation of using administrative data from iPHIS is that PHNs tended to use a mix of text-based narrative notes to record prenatal encounters, along with EDCO, a data field based record for documenting educational encounters with women. This inconsistency made it difficult to know which women had received individual prenatal services. It would have been

valuable to know how many of the priority women had also received prenatal attention.

In this study, the identification of priority status was based on the number of postnatal contacts with PHNs. This was because there was no consistent approach taken by PHNs to document social risk factors in iPHIS. Although it was the practice for PHNs to only offer additional and ongoing visits to women with social risk factors, there was no way of knowing from this administrative data set, exactly what those risk factors were.

Aside from the drawbacks related to the use of administrative data, there were limitations related to the group of PHNs who agreed to participate in this study. There were sixteen participants from across three different communities. A greater number of PHN participants would have provided a richer source of data, but it was difficult to recruit more nurses at that time. Another limitation was the retrospective approach taken for this project, where PHNs were asked to recall the nature of their practice from several years past. It was challenging for some participants to remember details, such as the type of resources, supports, and guiding documents they relied on, but also because of more recent changes to perinatal services within the organization, which had significantly shifted the nature of their practice.

A further limitation of this study is the missing perspective of managers and directors within this health authority. In exploring the organizational factors affecting the ability of PHNs to work with priority perinatal women, managers and directors may have been able to offer a different view of issues, such as union contract requirements, Workers Compensation Board considerations, and budget implications affecting the larger healthcare organization. As a past manager in this organization, I occasionally contributed my perspective when I felt it would substantiate the experiences of PHNs. However, given my history with this health authority, it could be suggested that I, as a researcher, was too close to the subject, and this could also be seen

as a limitation.

The perspective of priority perinatal women is another aspect that is absent from this study, and would have added a different point of view. However, the intent of this case study was to explore ways in which the healthcare organization influenced the ability of PHNs to work with priority families, and how services and outcomes might be improved.

### **Implications for PHN Practice, Policy, and Research**

This study has demonstrated that PHNs make a difference in the lives of priority perinatal families by improving breastfeeding initiation and duration rates, and rates of childhood immunizations. It has further showed that factors within the healthcare organization can have a bearing on health outcomes. In addition, this study has also demonstrated that useful information can be gleaned from administrative data based on routine PHN documentation. These findings have significant implications for practice, policy, and research.

#### **Practice.**

There are several ways in which PHN practice could be improved based on the results of this case study. One implication for practice is the way in which improvements to practice are promoted. Throughout the interviews PHNs repeatedly mentioned how often they turned to other PHNs and coworkers for information, advice, direction, and support in dealing with both routine and challenging situations. They turned to each other more readily than checking official policy or procedure manuals, despite the on-line availability of a range of guiding documents. Nurses also tended to look to peers before they consulted with supervisors or managers. Given this informal network of support, one way to improve documentation and data collection, as well as other components of PHN practice, would be to raise the level of understanding with all members of the team to ensure that everyone is consistently working to the same standard and

supporting each other with the best level of information.

With more attention to administrative data quality and consistency, a wider range of health outcomes could be regularly tracked and improvements to services implemented. Feedback about program and service effectiveness for specific subsets of groups could become a regular part of the quality improvement cycle. It was my experience in this organization that, during the timeframe of this study, although immunization data were routinely monitored for different age groups, other sub-groupings of the population, such as priority children, were not considered. Using administrative data might help to identify groups or areas with lower immunization rates, and provide an opportunity to develop strategies to reach those groups. Exclusive breastfeeding rates could be explored if the data collected were more accurate. Areas with lower breastfeeding rates might be offered additional supports and services. Developing ways to track community level PHN activities over time, and linking those to health care goals could also work to enhance PHN practice. Improving all aspects of PHN documentation is an important implication for practice, as well as for policy, and research.

### **Policy.**

The ability to track such local health outcomes depends on good quality administrative data. Establishing clear health authority policies regarding documentation practices, as well as regular reviewing and auditing of PHN charting to provide feedback and improvement would help to demonstrate the achievement of desired health goals, and the effectiveness of PHN services. In addition, using nationally consistent definitions and data collection measures would enable healthcare organizations to compare their rates of key outcome measures with other jurisdictions across the country. Examining outcomes over time and in relation to major shifts in program direction could provide valuable information about the effectiveness of PHN services.

Over the past few years the province of BC has participated in a large research project using the Nurse-Family Partnership program. When this research project is completed, health authorities will need to decide what kind of services they can continue to provide. The information and insights gathered from this case study may help in recognizing that skilled and knowledgeable PHNs are already in place to do this work, and will be able to continue this work if they are supported with policies that provide clear direction, ongoing education, time, and resources.

In keeping with the critical caring theory, PHNs in this study have clearly identified that positive relationships are an essential component of working with priority perinatal women, as well as with groups, communities, and coworkers. They also indicated that they had good support and direction within their organization for immunizations and breastfeeding. In both areas, priority perinatal women in this study had better than expected outcomes. Household tobacco use, on the other hand, remained significantly higher than the non-priority population.

Although nicotine addiction is a significant challenge, and not as easily addressed as immunizations or breastfeeding, one reason for the poor household tobacco rates in this study may have been the lack of a clear organizational vision and guidelines for PHNs around tobacco reduction and cessation, despite the positive relationships with priority families. Nurses spoke about not having a good sense of what to offer families, how they had to find information on their own, and how they were unable to offer supports, such as the nicotine replacement patch. When a trusting relationship is already established with a PHN, not having the tools to support families with tobacco cessation seems to be a missed opportunity, and a significant implication for policy.

## **Research.**

An important implication for research came from the voices of PHNs interviewed for this case study. Many nurses spoke about recent changes to perinatal services, and how they were concerned that families at risk might not be offered the support they could use, and that opportunities to develop relationships with individuals and communities might be lost. The results from this research could provide a baseline measure of key perinatal outcomes for a time just prior to these significant changes. An evaluation of the same outcomes two years after the implementation might offer some insight into the effectiveness and value of those changes. Research of this nature would provide an opportunity to assess the effectiveness of PHN practice as it unfolds in the real-life and complex conditions of day-to-day practice. Exploration of cost effective approaches to achieving key health outcomes would be of benefit to many jurisdictions across the country.

## **Future Research Directions**

Findings from this case study have provided a baseline measure of three outcomes of interest, along with insights about the nature of organizational supports for PHNs working with priority perinatal women and their families. Future research could involve a replication of this study within the same health authority to explore differences following major shifts in PHN services.

As well as investigating key outcomes, an additional area of research would be in the use of administrative data based on routine PHN documentation. The administrative data used in this case study was limited to individual client data from the older iPHIS program, but further research could be undertaken to determine if the new Panorama information system provides better consistency and quality of data in a form that is accessible to managers and PHNs within

the health authority. In addition, research incorporating related contextual data, such as staffing levels, or population demographics along with local area client data would help to provide a more fulsome picture of PHN effectiveness.

With the conclusion of the Nurse-Family Partnership research project in BC, future research will be important to explore a wider range of health outcomes for the priority perinatal population, in whatever way it is defined by the province. Such research should be designed to take into account the effects of community and systems level activities in which PHNs are involved, as well as measuring the effects of the continuity of services over time. In relation to this, and in recognition of the concerns voiced by PHNs regarding other recent changes to their range of services, further research needs to be done to determine what difference PHNs make for priority perinatal families in the context of real life, day-to-day practice.

### **Concluding Remarks**

Over the years of my experience as a manager of public health nursing, I became interested in learning more about what the vast amount of client data collected by PHNs could tell us regarding the effectiveness of their services with priority perinatal women. I knew, however, that numbers alone would not tell the whole story. It was from this perspective that I undertook this case study research project to explore three key outcomes based on administrative data, along with the context of routine, day-to-day PHN service provision in one health authority. It has been my privilege to hear from PHNs about their experiences and perspectives, and I appreciated their willingness to speak openly to me about their concerns and their achievements. Putting their views together with measured outcomes has underscored the many overlapping complexities of the organization and the workplace environment. I hope that this case study will be of value to other managers in examining their services, and planning for more effective

programs.

By adopting a critical realist philosophy, I was able to combine the quantitative outcome findings with the themes identified in the qualitative analysis to explore the underlying mechanisms that appeared to influence the ability of PHNs in ordinary day-to-day working conditions to engage successfully with individuals and communities. The critical caring theory, used as a framework for this study, reflected the means by which PHNs were able to achieve the desired goals of improving breastfeeding and infant immunization rates. Although tobacco reduction goals were not realized, this study highlighted a missed opportunity that could be addressed by better equipping PHNs with guidance, knowledge, and skill related to tobacco cessation, and by building on the already established trusting relationships with priority families. Perinatal women have identified the need for support to quit smoking for themselves and for their partners, and have also identified the need for more positive support from healthcare providers (Wigginton & Lee, 2013). PHNs are well placed to offer that support.

Research has shown that the priority population of new mothers are less likely to initiate and continue breastfeeding, less likely to immunize their children, and more likely to smoke than the general population (Adams et al., 2008; Ahluwalia et al., 2005; Erickson & Arbour, 2012; Falagas and Zarkadoulia, 2008; Kim et al., 2007; Renfrew et al., 2012; Strathearn et al., 2009; U.S. Department of Health and Human Services, 2014). This case study has shown that in this health authority women who received five or more postnatal encounters with PHNs initiated and continued breastfeeding in higher proportions than expected, and immunized their children in higher proportions than expected. This was accomplished despite many other workplace demands, no specialized training, and no additional funding. The overlapping themes that emerged from interviews with PHNs illustrated the complexity of the organizational factors that

can affect PHN practice, and ultimately client outcomes. However, regardless of the ebb and flow of such complex organizational influences, PHNs were able to take advantage of those “brief shining moments” (Loewe & Lerner, 1962), when an array of positive influences aligned, to connect with families and improve the health of communities. Considering the challenges that PHNs encounter in providing service to their communities, they seem to have learned to navigate the many complexities of the healthcare organization thereby enabling them to achieve some of their intended goals. In asking “what difference do PHNs make?”, the findings of this case study would suggest that indeed they do make a positive difference for priority perinatal women.

## References

- AbouZahr, C., & Boerma, T. (2005). Health information systems: the foundations of public health. *Bulletin of the World Health Organization*, *83*, 578-583.
- Ackroyd, S., & Karlsson, J. (2014). Critical realism, research techniques, and research designs. In P. K. Edwards, J. O'Mahoney, & S. Vincent (Eds.), *Studying organizations using critical realism* (pp. 21-45). New York: Oxford University Press.
- Adams, K. E., Melvin, C. L., & Raskind-Hood, C. L. (2008). Sociodemographic, insurance, and risk profiles of maternal smokers post the 1990s: How can we reach them? *Nicotine and Tobacco Research*, *10*(7), 1121-1129.
- Agrawal, A., Scherrer, J. F., Grant, J. D., Sartor, C. E., Pergadia, M. L., Duncan, A. E., Madden, P. A., ... Xian, H. (2010). The effects of maternal smoking during pregnancy on offspring outcomes. *Preventive Medicine*, *50*, 13-18.
- Ahern, K. J. (1999). Ten tips for reflexive bracketing. *Qualitative Health Research*, *9*(3), 407-411.
- Ahluwalia, I., Morrow, B., & Hsia, J. (2005). Why do women stop breastfeeding? Findings from the pregnancy risk assessment and monitoring system. *Pediatrics*, *116*(6), 1408-1412.
- Albrecht, S. A., Caruthers, D., Patrick, T., Reynolds, M., Salamie, D., Higgins, L. W., Braxter, B., ... Mlynarchek, S. (2006). A randomized controlled trial of a smoking cessation intervention for pregnant adolescents. *Nursing Research*, *55*(6), 402-410.
- American College of Obstetricians, & Gynecologists. (Eds.). (2005/2015). *Smoking cessation during pregnancy*. Retrieved April 21, 2017, from [www.acog.org/Resources-And-Publications/Committee-on-health-care-for-underserved-women/smoking-cessation-during-pregnancy](http://www.acog.org/Resources-And-Publications/Committee-on-health-care-for-underserved-women/smoking-cessation-during-pregnancy)

- Ames, H., Glenton, C., & Lewin, S. (2017). Parents' and informal caregivers' views and experiences of communication about routine childhood vaccination: A synthesis of qualitative evidence. *Cochrane Database of Systematic Reviews*, 2017(2), 1-140.
- Angus, J. E. (2012). Using critical realism in nursing and health research: Promise and challenges. *Nursing Inquiry*, 19(1), 1-3.
- Anthony, S., & Jack, S. (2009). Qualitative case study methodology in nursing research: An integrative review. *Journal of Advanced Nursing*, 65(6), 1171-1181.
- Appleton, J. V., & King, L. (2002). Methodological issues in nursing research: Journeying from the philosophical contemplation of constructivism to the methodological pragmatics of health services research. *Journal of Advanced Nursing*, 40(6), 641-648.
- Armstrong, K. L., Fraser, J. A., Dadds, M. R., & Morris, J. (2000). Promoting secure attachment, maternal mood and child health in a vulnerable population: A randomized controlled trial. *Journal of Paediatric Child Health*, 36, 555-562.
- Association of Women's Health, Obstetric, & Neonatal Nurses. (2015). Breastfeeding: AWHONN position statement. *Journal of Obstetric Gynecologic and Neonatal Nursing*, 44(1), 83-88.
- Avidano Britton, G. R., Brinthaup, J., Stehle, J. M., & James, G. D. (2006). The effectiveness of a nurse-managed perinatal smoking cessation program implemented in a rural county. *Nicotine & Tobacco Research*, 8(1), 13-28.
- Azulay Chertok, I., & Hayes Archer, S. (2015). Evaluation of a midwife- and nurse-delivered 5 A's prenatal smoking cessation program. *Journal of Midwifery and Women's Health*, 60(2), 175-181.

- Baba, S., Wikstrom, A. K., Stephansson, O., & Cnattingius, S. (2012). Influence of smoking and snuff cessation on risk of preterm birth. *European Journal of Epidemiology*, 27(4), 297-304.
- Bailey, B. A. (2015). Effectiveness of a pregnancy smoking intervention: The Tennessee intervention for pregnant smokers program. *Health Education and Behavior*, 42(6), 824-831.
- Barnard, C. I. (1968). *The functions of the executive* (30th ed.). Cambridge, Massachusetts: Harvard University Press. (Original work published 1938)
- Barnes-Boyd, C. (1995). Effects of sustained nurse/mother contact on infant outcomes among low-income African-American families. *Public Health Nursing*, 12(6), 378-385.
- Bartu, A., Sharp, J., Ludlow, J., & Doherty, D. A. (2006). Postnatal home visiting for illicit drug-using mothers and their infants: A randomized controlled trial. *Australian and New Zealand Journal of Obstetrics and Gynaecology*, 46, 419-426.
- Baxter, P., & Jack, S. (2008). Qualitative case study methodology: Study design and implementation for novice researchers. *The Qualitative Report*, 13(4), 544-559.
- BC Centre for Disease Control. (Ed.). (2016, August). *Communicable disease control immunization program section IIA immunization schedules*. Retrieved April 12, 2017, from [www.bccdc.ca](http://www.bccdc.ca)
- BC Centre for Disease Control. (Ed.). *Data standards proposed policy #7. BC Centre for Disease Control*. (n.d.). Retrieved May 25, 2015, from [www.bccdc.ca/util/about/DataAccessRequests/default.htm](http://www.bccdc.ca/util/about/DataAccessRequests/default.htm)
- BC Centre for Disease Control. (Ed.). (2017, February). *Immunization uptake in children by the second birthday 2007-2016*. Retrieved March 23, 2017, from [www.bccdc.ca](http://www.bccdc.ca)

- BC Centre for Disease Control. (Ed.). (2017). *Public Health Data*. Retrieved April 12, 2017, from www.bccdc.ca
- BC Laws. (Ed.). (2015). *Freedom of information and protection of privacy act*. Retrieved May 25, 2015, from www.bclaws.ca/Recon/document/ID/freeside/96165\_00
- BC Ministry of Health. (2005). Framework for Core Functions in Public Health. In *Reproductive health and the prevention of disabilities* (Population Health and Wellness). Victoria, British Columbia: B.C. Ministry of Health.
- BC Ministry of Health. (2013). *Promote protect prevent - our health begins here* (BC's guiding framework for public health). Victoria, British Columbia: B.C. Ministry of Health.
- BC Ministry of Healthy Living, & Sport. (2009). *Model core program paper for reproductive health and prevention of disability* (Model core program papers). Victoria, BC: Hollander Analytical Services Ltd.
- Beattie-Fairchild, C. (2013). Overcoming barriers to improve breastfeeding self-efficacy in older adolescent mothers (Doctoral dissertation, Walden University, AAI3554779 2013). *Dissertation Abstracts*, 1-205.
- Bergen, A., & While, A. (2000). A case for case studies: Exploring the use of case study design in community nursing research. *Journal of Advanced Nursing*, 31(4), 926-934.
- Bergin, M., Wells, J. S., & Owen, S. (2008). Critical realism: A philosophical framework for the study of gender and mental health. *Nursing Philosophy*, 9(3), 169-179.
- Betker, C., MacDonald, M., Hill, M. E., & Kirk, M. (2016). Theoretical foundations of community health nursing. In L. L. Stamler, L. Yiu, & A. Dosani (Eds.), *Community health nursing: A Canadian perspective* (pp. 101-134). Toronto, Canada: Pearson.
- Bhaskar, R. (1978). *A realist theory of science* (2nd ed.). Brighton, UK: Harvester Press.

- Bhaskar, R. (1998a). General introduction. In M. Archer, R. Bhaskar, A. Collier, T. Lawson, & A. Norrie (Eds.), *Critical realism: Essential readings* (pp. ix-xxiv). London: Routledge.
- Bhaskar, R. (1998b). Philosophy and scientific realism. In M. Archer, R. Bhaskar, A. Collier, T. Lawson, & A. Norrie (Eds.), *Critical realism: Essential readings* (pp. 16-47). London: Routledge.
- Bhaskar, R. (1998c). *The possibility of naturalism* (3rd ed.). London: Routledge. (Original work published 1979)
- Bhaskar, R. (2008). *A realist theory of science*. London: Routledge.
- Bhaskar, R., & Lawson, T. (1998). Introduction: Basic texts and developments. In M. Archer, R. Bhaskar, A. Collier, T. Lawson, & A. Norrie (Eds.), *Critical realism: Essential readings* (pp. 3-15). London: Routledge.
- Biesta, G. (2010). Pragmatism and the philosophical foundations of mixed methods research. In *Sage handbook of mixed methods in social and behavioral research* (pp. 95-118). Thousand Oaks, CA: Sage Publications.
- Bolling, K., Grant, C., Hamlyn, B., & Thornton, A. (2007). *Infant feeding survey 2005* (The Information Centre for Health and Social Care). Retrieved April 24, 2015, from [www.hscic.gov.uk/article/2021/Website-search?productid=1376&q=infant+feeding+survey+2005&sort=Relevance&size=10&page=1&area=both#top](http://www.hscic.gov.uk/article/2021/Website-search?productid=1376&q=infant+feeding+survey+2005&sort=Relevance&size=10&page=1&area=both#top)
- Bonner, A., & Tolhurst, G. (2002). Insider-outsider perspectives of participant observation. *Nurse Researcher*, 9(4), 7-19.
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77-101.

- Braveman, P., & Gruskin, S. (2003). Defining equity in health. *Journal of Epidemiology and Community Health, 57*, 254-258.
- Breen, L. J. (2007). The researcher 'in the middle': Negotiating the insider/outsider dichotomy. *The Australian Community Psychologist, 19*(1), 163-174.
- Brewer, J., & Hunter, A. (2006). *Foundations of multimethod research: Synthesizing styles*. Thousand Oaks, California: Sage Publications.
- Briscoe, L., Lavender, T., & McGowan, L. (2016). A concept analysis of women's vulnerability during pregnancy, birth and the postnatal period. *Journal of Advanced Nursing, 72*(10), 1-16.
- Bullock, L., Everett, K. D., Dolan Mullen, P., Geden, E., Longo, D. R., & Madsen, R. (2009). Baby BEEP: A randomized controlled trial of nurses' individualized social support for poor rural pregnant smokers. *Maternal Child Health Journal, 13*, 395-406.
- Burns, N., & Grove, S. (2009). *The practice of nursing research*. St. Louis, Missouri: Saunders Elsevier.
- Canadian Institute of Child Health. (1993). *Prevention of low birth weight in Canada: Literature review and strategies*. Ontario, Canada: Author.
- Canadian Public Health Association. (Ed.). (2010). *Public health ~ community health nursing practice in Canada: Roles and activities* (4th ed.). Ottawa, Ontario: Author.
- Carlsson, S. A. (2005). Developing information systems design knowledge: A critical realist perspective. *The Electronic Journal of Business Research Methodology, 3*(2), 93-102.  
Retrieved April 23, 2014, from [www.ejbrm.com](http://www.ejbrm.com)
- Carper, B. (1978). Fundamental patterns of knowing in nursing. *Advances in Nursing Science, 1*, 13-23.

- Chalmers, K., Gupton, A., Katz, A., Hack, T., Hildes-Ripstein, E., Brown, J., McMillan, D., ... Cann, B. (2004). The description and evaluation of a longitudinal pilot study of a smoking relapse/reduction intervention for perinatal women. *Journal of Advanced Nursing, 45*(2), 162-171.
- Chamberlain, C., O'Mara-Eves, A., Porter, J., Coleman, T., Perlen, S. M., Thomas, J., & McKenzie, J. E. (2017). Psychosocial interventions for supporting women to stop smoking in pregnancy. *Cochrane Database of Systematic Reviews, 2017*(2), 1-530.
- Chapman, D. J., & Perez-Escamilla, R. (2012). Breastfeeding among minority women: Moving from risk factors to interventions. *Advances in Nutrition, 3*, 95-104.
- Cheung, R., Moody, L., & Cockram, C. (2002). Data mining strategies for shaping nursing and health policy agendas. *Policy, Politics, and Nursing Practice, 3*(3), 248-260.
- Chizimuzo, T. C., Greaves, L., Bottorff, J. L., & Marcellus, L. M. (2010). Health care providers' engagement in smoking cessation with pregnant smokers. *Journal of Obstetric, Gynecologic, and Neonatal Nursing, 39*(1), 64-77.
- Clark, A. M., Lissel, S. L., & Davis, C. (2008). Complex critical realism: Tenets and application in nursing research. *Advances in Nursing Science, 31*(4), E67-E79.
- College of Registered Nurses of British Columbia. (2008, February). *Documentation* (Version 334) [Practice standard for registered nurses and nurse practitioners]. Retrieved March 25, 2012, <https://www.crnbc.ca/standards/Lists/standards>
- Commissioner of Health Services. (2003, August 14). *Integrated public health information system (iPHIS) pilot project*. Retrieved April 1, 2017, from [www.archives.york.ca](http://www.archives.york.ca)
- Community Health Nurses of Canada. (Ed.). (2009). *Public health nursing discipline specific competencies* (1st ed.). Toronto, Ontario: Community Health Nurses of Canada.

- Community Health Nurses of Canada. (Ed.). (2011). *Canadian community health nursing professional practice model and standards of practice*. Toronto, Ontario: Author.
- Creswell, J. (2013). *Qualitative inquiry and research design: Choosing among five approaches*. Thousand Oaks, California: Sage Publications.
- Cricco-Lizza, R. (2006). Black non-Hispanic mothers' perceptions about the promotion of infant-feeding methods by nurses and physicians. *Journal of Obstetric, Gynecologic, and Neonatal Nursing*, 35(2), 173-180.
- Cross, B., & MacDonald, M. (2013). Developing a relationship with the computer in nursing practice: A grounded theory. *Canadian Journal of Nursing Research*, 45(1), 114-137. Retrieved April 25, 2013, from <http://hdl.handle.net/1828/3591>
- Crotty, M. (2010). *The foundations of social research: Meaning and perspective in the research process*. London: Sage Publications.
- Cruickshank, J. (2012). Positioning positivism, critical realism and social constructionism in the health sciences: A philosophical orientation. *Nursing Inquiry*, 19(1), 71-82.
- Cutcliffe, J. R. (2003). Reconsidering reflexivity: Introducing the case for intellectual entrepreneurship. *Qualitative Health Research*, 13(1), 136-148.
- Danermark, B., Ekstrom, M., Jakobsen, L., & Karlsson, J. (2002). *Explaining society: Critical realism in the social sciences*. London: Routledge.
- Deal, L. W. (1994). The effectiveness of community health nursing interventions: A literature review. *Public Health Nursing*, 11(5), 315-323.
- Dietz, P. M., England, L. J., Shapiro-Mendoza, C. K., Tong, V. T., Farr, S. L., & Callaghan, W. M. (2010). Infant morbidity and mortality attributable to prenatal smoking in the U.S. *American Journal of Preventive Medicine*, 39(1), 45-52.

- Doiron, D., Raina, P., & Fortier, I. (2013). Linking Canadian population health data: Maximizing the potential of cohort and administrative data. *Canadian Journal of Public Health, 104*(3), e258-e261.
- Donath, S. M., Amir, L. H., & the ALSPAC Study Team. (2003). Relationship between prenatal infant feeding intention and initiation and duration of breastfeeding: a cohort study. *Acta Paediatr, 92*, 352-356.
- Doran, D. (2004). *Collecting data on nursing-sensitive outcomes in different care settings: Can it be done? What are the benefits?* (Report of the Nursing and Health Outcomes Feasibility Study, pp. 1-27). Toronto, Ontario: Faculty of Nursing, University of Toronto.
- Dowling, M. (2006). Approaches to reflexivity in qualitative research. *Nurse Researcher, 13*(3), 7-21.
- Dubas, H. (Ed.). (2012). *Public Health Nurse Job Description*. (Available from Vancouver Island Health Authority).
- Dunn, R. L., Kalich, K. A., Henning, M. J., & Fedrizzi, R. (2015). Engaging field-based professionals in a qualitative assessment of barriers and positive contributors to breastfeeding using the social ecological model. *Maternal Child Health Journal, 19*, 6-16.
- Dyson, L., Green, J. M., Renfrew, M. J., McMillan, B., & Woolridge, M. (2010). Factors influencing the infant feeding decision for socioeconomically deprived pregnant teenagers: The moral dimension. *Birth, 37*(2), 141-149.
- Eidelman, A. I., & Schanler, R. J. (2012). Breastfeeding and the use of human milk. *Pediatrics, 129*(3), e827-e841.

- Erickson, A. C., & Arbour, L. T. (2012). Heavy smoking during pregnancy as a marker for other risk factors of adverse birth outcomes: A population-based study in British Columbia, Canada. *BMC Public Health, 12*(102). Retrieved March 23, 2012, from <http://www.biomedcentral.com/1471-2458/12/102>
- Ershoff, D. H., Quinn, V. P., Boyd, N. R., Stern, J., Gregory, M., & Wirtschafter, D. (1999). The Kaiser Permanente prenatal smoking-cessation trial: When more isn't better, what is enough? *American Journal of Preventive Medicine, 17*(3), 161-168.
- EU Project on Promotion of Breastfeeding in Europe. (2004). *Protection, promotion and support of breastfeeding in Europe: A blueprint for action* (European Commission, Directorate Public Health and Risk Assessment). Retrieved April 24, 2015, from [http://europa.eu.int/comm/health/ph\\_projects/2002/promotion/promotion\\_2002\\_18\\_en.htm](http://europa.eu.int/comm/health/ph_projects/2002/promotion/promotion_2002_18_en.htm)
- Ezzy, D. (2002). *Qualitative analysis: Practice and innovation*. London: Routledge.
- Falagas, M. E., & Zarkadoulia, E. (2008). Factors associated with suboptimal compliance to vaccinations in children in developed countries: a systematic review. *Current Medical Research and Opinion, 24*(6), 1719-1741.
- Falk-Rafael, A. R. (1996). Power and caring: A dialectic in nursing. *Advances in Nursing Science, 19*(1), 3-17.
- Falk-Rafael, A., (2000a). Nurses' orientation to change: Debunking the "resistance to change" myth. *Journal of Professional Nursing, 16*(6), 336-344.
- Falk-Rafael, A. R. (2000b). Watson's philosophy, science, and theory of human caring as a conceptual framework for guiding community health nursing practice. *Advances in Nursing Science, 23*(2), 34-49.

- Falk-Rafael, A. (2005). Advancing nursing theory through theory-guided practice: The emergence of a critical caring perspective. *Advances in Nursing Science*, 28, 38-49.
- Falk-Rafael, A., & Betker, C. (2012a). The primacy of relationships: A Study of public health nursing practice from a critical caring perspective. *Advances in Nursing Science*, 35, 315-332.
- Falk-Rafael, A., & Betker, C. (2012b). Witnessing social injustice downstream and advocating for health equity upstream: "The trombone slide" of nursing. *Advances in Nursing Science*, 35(2), 98-112.
- Feemster, K. A., Spain, C. V., Eberhart, M., Pati, S., & Watson, B. (2009). Identifying infants at increased risk for late initiation of immunizations: Maternal and provider characteristics. *Public Health Reports*, 124, 42-53.
- Feig, C. (2011, January 15). In World Health Organization (Ed.), *Exclusive breastfeeding for six months best for babies everywhere*. Retrieved January 29, 2017, from [www.who.int](http://www.who.int)
- Fetrick, A., Christensen, M., & Mitchell, C. (2003). Does public health nurse home visitation make a difference in the outcomes of pregnant clients and their offspring? *Public Health Nursing*, 20(3), 184-189.
- Finlay, L. (2002). "Outing" the researcher: The provenance, process, and practice of reflexivity. *Qualitative Health Research*, 12(4), 531-545.
- Finlayson, E., & Birkmeyer, J. D. (2009). Research based on administrative data. *Surgery*, 145, 610-616.
- Fiore, M. C. (2008, May). In US Dept. of Health & Human Services (Eds.), *Treating tobacco and dependence: 2008 update*.

- Flaskerud, J., & Winslow, B. (1998). Conceptualizing vulnerable populations health related research. *Nursing Research, 47*(2), 69-78.
- Flemming, K., Graham, H., Heirs, M., Fox, D., & Sowden, A. (2013). Smoking in pregnancy: A systematic review of qualitative research of women who commence pregnancy as smokers. *Journal of Advanced Nursing, 69*(5), 1023-1026.
- Flemming, K., Graham, H., McCaughan, D., Angus, K., Sinclair, L., & Bauld, L. (2016). Health professionals' perceptions of the barriers and facilitators to providing smoking cessation advice to women in pregnancy and during the post-partum period: A systematic review of qualitative research. *Bmc Public Health, 16*(290), 1-13.
- Flemming, N., Ng, N., Osborne, C., Biederman, S., Yasseen, S., Dy, J., Rennicks White, R., ... Walker, M. (2013). Adolescent pregnancy outcomes in the province of Ontario: A cohort study. *Journal of Obstetrics and Gynaecology Canada, 35*(3), 234-45.
- Flynn, L., Budd, M., & Modelski, J. (2008). Enhancing resource utilization among pregnant adolescents. *Public Health Nursing, 25*(2), 140-148.
- Flyvbjerg, B. (2011). Case study. In N. Denzin & Y. Lincoln (Eds.), *The Sage handbook of qualitative research* (4th ed., pp. 301-316). Thousand Oaks, California: Sage Publications.
- Freney, Y. M., Tiernan, J. (2009). Exploration of the facilitators of and barriers to work engagement. *International Journal of Nursing Studies, 46*, 1557-1565.
- Gaffney, K. F., Baghi, H., & Sheehan, S. E. (2009). Two decades of nurse-led research on smoking during pregnancy and postpartum: Concept development to intervention trials. *Annual Review of Nursing Research, 27*, 195-219.

- Garmon, S. C. (2007). Issues associated with secondary analysis of population health data. *Applied Nursing Research, 20*, 94-99.
- Garson, D. G. (n.d.). *Logistic regression*. Retrieved May 22, 2015, from <http://www2.chass.ncsu.edu/garson/pa765/logistic.htm>
- Gebauer, C., Kwo, C., Haynes, E. F., & Wewers, M. E. (1998). A nurse-managed smoking cessation intervention during pregnancy. *Journal of Obstetric, Gynecologic, and Neonatal Nursing, 27*(1), 47-53.
- Gerrish, K. (1997). Being a 'marginal native': Dilemmas of the participant observer. *Nurse Researcher, 5*(1), 25-34.
- Gerring, J. (2004). What is a case study and what is it good for? *American Political Science Review, 98*(2), 341-354.
- Gerrits, L., & Verweij, S. (2013). Critical realism as a meta-framework for understanding the relationships between complexity and qualitative comparative analysis. *Journal of Critical Realism, 12*(2), 166-182.
- Gionet, L. (2015). In Statistics Canada (Ed.), *Breastfeeding trends in Canada*. Retrieved March 18, 2017, from [www.statcan.gc.ca](http://www.statcan.gc.ca)
- Glaser, B. G., & Strauss, A. L. (1999). *The discovery of grounded theory: Strategies for qualitative research*. New Brunswick, NJ: Aldine Transaction. (Original work published 1967)
- Gold, R. L. (1958). Roles in sociological field observations. *Oxford Journals, 36*(3), 217-223.
- Goodwin, L., Van Dyne, M., Lin, S., & Talbert, S. (2003). Data mining issues and opportunities for building nursing knowledge. *Journal of Biomedical Informatics, 36*, 379-388.

- Gould, G. S., Bittoun, R., & Clarke, M. J. (2014). A pragmatic guide for smoking cessation counselling and the initiation of nicotine replacement therapy for pregnant aboriginal and Torres Strait Islander smokers. *Journal of Smoking Cessation, 10*(2), 96-105.
- Grassley, J. S. (2010). Adolescent mothers' breastfeeding and social support needs. *Journal of Obstetric, Gynecologic, and Neonatal Nursing, 39*, 713-722.
- Grassley, J. S., & Nelms, T. P. (2008). The breastfeeding conversation: A philosophic exploration of support. *Advances in Nursing Science, 31*(4), E55-E66.
- Green, M. M. (1984). *Through the years with public health nursing*. Ottawa, Ontario, Canada: The Canadian Public Health Association.
- Greene, J. (2007). *Mixed methods in social inquiry*. San Francisco: Jossey-Bass.
- Hall Moran, V., Edwards, J., Dykes, F., & Downe, S. (2007). A systematic review of the nature of support for breastfeeding adolescent mothers. *Midwifery, 23*, 157-171.
- Hamilton, N., & Bhatti, T. (1996). *Population health promotion: An integrated model of population health and health promotion* (Public Health Agency of Canada). Ottawa, Ontario: Public Health Agency of Canada.
- Health Canada. (n.d. a). *Nutrition for healthy term infants: Recommendations from six to 24 months*. Retrieved January 5, 2015, from [www.hc-sc.gc.ca/fn-an/nutrition/infant-nourisson/recom/recom-6-24-months-mois-eng.php](http://www.hc-sc.gc.ca/fn-an/nutrition/infant-nourisson/recom/recom-6-24-months-mois-eng.php)
- Health Canada. (n.d. b). *Nutrition for healthy term infants: Recommendations from birth to six months*. Retrieved January 5, 2015, from [www.hc-sc.gc.ca/fn-an/nutrition/infant-nourisson/recom/index-eng.php#a4](http://www.hc-sc.gc.ca/fn-an/nutrition/infant-nourisson/recom/index-eng.php#a4)

- Herrmann, M. M., Van Cleve, L., & Levisen, L. (1998). Parenting competence, social support, and self-esteem in teen mothers case managed by public health nurses. *Public Health Nursing, 15*(6), 432-439.
- Hill, M. E. (Ed.). (2010a, April). Interprofessional Practice Guideline: Community Perinatal Health Support for Priority Populations of Women and Their Families. (Available from Vancouver Island Health Authority).
- Hill, M. (Ed.). (2010b). Supporting Document for Interprofessional Practice Guideline: Community Perinatal Health Support for Priority Populations of Women and their Families. (Available from Vancouver Island Health Authority).
- Hill, M. E., Beaton, T., Graczyk, J., Stott, J., & Yablonski, C. (2013). Most kids don't: Changing perceptions about tobacco use. *Canadian Nurse, 109*(5), in press.
- Hill, P. D., & Aldag, J. C. (1996). Smoking and breastfeeding status. *Research in Nursing and Health, 19*, 125-132.
- Horta, B. L., Bahl, R., Martines, J. C., & Victora, C. G. (2007). *Evidence on the long-term effects of breastfeeding: Systematic reviews and meta-analyses* (World Health Organization). Geneva, Switzerland: World Health Organization.
- Howe, K. (1985). Two dogmas of educational research. *Educational Researcher, 14*(8), 10-18.
- Howe, K. (1988). Against the quantitative-qualitative incompatibility thesis or dogmas die hard. *Educational Researcher, 17*(10), 10-16.
- Howell, D. (2008). *Fundamental statistics for the behavioral sciences* (6th ed.). Belmont, California: Thomson Wadsworth.

- Ilett, K. F., Hale, T. W., Page-Sharp, M., Kristensen, J. H., Kohan, R., & Hackett, P. (2003). Use of nicotine patches in breast-feeding mothers: Transfer of nicotine and cotinine into human milk. *Clinical Pharmacology and Therapeutics*, 74(6), 516-524.
- Ip, S., Chung, M., Raman, G., Chew, P., Magula, N., DeVine, D., Trikalinos, T., Lau, J. (2007). Breastfeeding and maternal and infant health outcomes in developed countries. In Tufts-New England Medical Center Evidence-Based Practice Center (Ed.), *AHRQ Publication No. 07-E007* (Evidence Report/Technology Assessment Number 153). Rockville, MD: Agency for Healthcare Research and Quality.
- Isaac, J. C. (1990). Realism and reality: Some realistic reconsiderations. *Journal for the Theory of Social Behaviour*, 20, 1-31.
- Isaac, M.R., Chartier, M., Brownell, M., Chateau, D., Nickel, N.C., Martens, P., Katz, A., ... PATHS Equity Team Members. (2015). Can opportunities be enhanced for vaccinating children in home visiting programs? A population based cohort study. *Bmc Public Health*, 15, 1-11.
- Island Health. (Ed.). (2013). *Public Health Nursing*. Retrieved April 26, 2017, from [www.viha.ca](http://www.viha.ca)
- Jack, S. K., DiCenso, A., & Lohfeld, L. (2005). A theory of maternal engagement with public health nurses and family visitors. *Journal of Advanced Nursing*, 49(2), 182-190.
- Jackson, W., & Verberg, N. (2007). *Methods: Doing social research* (4th ed.). Toronto, Canada: Pearson Prentice Hall.
- Jadelhack, R. (2012). Health promotion in nursing and cost-effectiveness. *Journal of Cultural Diversity*, 19(2), 65-68.

- Janesick, V. J. (2011). *"Stretching" exercises for qualitative researchers*. Thousand Oaks, California: Sage.
- Joffe, H. (2012). Thematic analysis. In D. Harper & A. Thompson (Eds.), *Qualitative research methods in mental health and psychotherapy: A guide for students and practitioners* (pp. 209-223). Chichester, UK: Wiley-Blackwell.
- Johnson, M., & Maas, M. (1998). The nursing outcomes classification. *Journal of Nursing Care Quality, 12*(5), 9-20.
- Johnson, R., & Onwuegbuzie, A. (2004). Mixed methods research: A research paradigm whose time has come. *Educational Researcher, 33*(7), 14-26.
- Johnston, D., Tough, S., & Siever, J. (2006). The community perinatal care study: Home visiting and nursing support for pregnant women. *Zero to Three, 27*(2), 11-17.
- Jootun, D., McGhee, G., & Marland, G. R. (2009). Reflexivity: Promoting rigour in qualitative research. *Nursing Standard, 23*(23), 42-46.
- Jutte, D. P., Roos, L. L., & Brownell, M. D. (2011). Administrative record linkage as a tool for public health research. *Annual Review of Public Health, 32*, 91-108.
- Kanhadilok, S., & McGrath, J. M. (2015). An integrative review of factors influencing breastfeeding in adolescent mothers. *The Journal of Perinatal Education, 24*(2), 119-127.
- Kemp, L., Harris, E., McMahon, C., Matthey, S., Vimpani, G., Anderson, T., Schmied, V., ... Zapart, S. (2011). Child and family outcomes of a long-term nurse home visitation programme: A randomized controlled trial. *Archives of Disease in Childhood, 96*(6), 533-540.
- Keith, J. M. (1988). Florence Nightingale: Statistician and consultant epidemiologist. *International Nursing Review, 35*(5), 147-150.

- Kim, S. S., Frimpong, J. A., Rivers, P. A., & Kronenfeld, J. J. (2007). Effects of maternal and provider characteristics on up-to-date immunization status of children aged 19 to 35 months. *American Journal of Public Health, 97*(2), 259-266.
- Kitzman, H. J., Cole, R., Yoos, H. L., & Olds, D. (1997). Challenges experienced by home visitors: A qualitative study of program implementation. *Journal of Community Psychology, 25*(1), 95-105.
- Kitzman, H., Olds, D. L., Henderson, C. R., Hanks, C., Cole, R., Tatelbaum, R., McConnochie, K. M., ... Barnard, K. (1997). Effect of prenatal and infancy home visitation by nurses on pregnancy outcomes, childhood injuries, and repeated childbearing. *Journal of the American Medical Association, 278*(8). doi:10.100/jama.1997.03550080054039
- Koniak-Griffin, D., Anderson, N., Brecht, M., Verzemnieks, I., Lesser, J., & Kim, S. (2002). Public health nursing care for adolescent mothers: Impact on infant health and selected maternal outcomes at 1 year postbirth. *Journal of Adolescent Health, 30*(1), 44-54.
- Kornides, M., & Kitsantas, P. (2013). Evaluation of breastfeeding promotion, support, and knowledge of benefits on breastfeeding outcomes. *Journal of Child Health Care, 17*(3), 264-273.
- Kringos, D. S., Sunol, R., Wagner, C., Mannion, R., Michel, P., Klazinga, N. S., & Groene, O. (2015). The influence of context on the effectiveness of hospital quality improvement strategies: A review of systematic reviews. *Bmc Health Services Research, 15*(277), 1-13.
- Kurtz Landy, C., Jack, S., Wahoush, O., Sheehan, D., & MacMillan, H. L. (2012). Mothers' experiences in the nurse-family partnership program: A qualitative case study. *BMC Nursing, 11*(15), 1-12.

- Kushniruck, A., & Borycki, E. (2011). Exploring the relationship between usability and technology-induced error: Unraveling a complex interaction. *Patient Safety Informatics*, 48-56.
- Kvale, S., & Brinkmann, S. (2009). *Interviews: Learning the craft of qualitative research interviewing* (2nd ed.). Thousand Oaks, California: Sage Publications.
- Lavenda, O., Hunter, B., McInerney, N., Bolick, L., Haselden, C., Tester, D., Knopf, H., ... Ha, Y. (2011). Administrative data as children's well-being indicators: The South Carolina data bridge project. *Child Indicators Research*, 4(3), 439-451.
- Leahy-Warren, P., Mulcahy, H., Phelan, A., & Corcoran, P. (2014). Factors influencing initiation and duration of breast feeding in Ireland. *Midwifery*, 30, 345-352.
- Leon-Cava, N., Lutter, S., Ross, J., & Martin, L. (2002). *Quantifying the benefits of breastfeeding: A summary of the evidence*. Washington, D.C: Pan American Health Organization.
- Likis, F. E., Andrews, J. C., Fonnesebeck, C. J., Hartmann, K. E., Jerome, R. N., Potter, S. A., Surawicz, T. S., ... McPheeters, M. L. (2014). *Smoking cessation interventions in pregnancy and postpartum* (14-E001-EF). Rockville, MD: Agency for Healthcare Research and Quality.
- Lincoln, Y. S., Lynham, S. A., & Guba, E. G. (2011). Paradigmatic controversies, contradictions, and emerging confluences, revisited. In *The Sage handbook of qualitative research* (pp. 97-128). Thousand Oaks, CA: Sage Publications.
- Loewe, F. (Composer), & Lerner, A.J. (Librettist). (1962). *Camelot* [vocal score]. New York, NY: Chappell Music.

- Lucero, R. J., & Bakken, S. (2013). Practice-based knowledge discovery for comparative effectiveness research: An organizing framework. *Canadian Journal of Nursing Research, 45*(1), 98-112. Retrieved April 25, 2013, from [www.ingentaconnect.com.ezproxy.library.uvic.ca/content/mcgill/cjnr/2013/00000045/00000001/art00010](http://www.ingentaconnect.com.ezproxy.library.uvic.ca/content/mcgill/cjnr/2013/00000045/00000001/art00010)
- Luck, L., Jackson, D., & Usher, K. (2006). Case study: A bridge across the paradigms. *Nursing Inquiry, 13*(2), 103-109.
- Luman, E. T., Mason McCauley, M., Shefer, A., & Chu, S. Y. (2003). Maternal characteristics associated with vaccination of young children. *Pediatrics, 111*(5), 1215-1218.
- Lunney, M., Delaney, C., Duffy, M., Moorhead, S., & Welton, J. (2005). Advocating for standardized nursing languages in electronic health records. *Journal of Nursing Administration, 35*(1), 1-3.
- MacDonald, S. E., Newburg-Cook, C. V., Allen, M., & Reutter, L. (2013). Embracing the population health framework in nursing research. *Nursing Inquiry, 20*(1), 30-41.
- MacGregor, E., & Hughes, M. (2010). Breastfeeding experiences of mothers from disadvantaged groups: A review. *Community Practitioner, 83*(7), 30-36.
- MacVicar, S., Kirkpatrick, P., Humphrey, T., & Forbes-McKay, K. E. (2015). Supporting breastfeeding establishment among socially disadvantaged women: A meta-synthesis. *Birth, 42*(4), 290-298.
- Malay, S., Shauver, M. J., & Chung, K. C. (2012). Applicability of large databases in outcomes research. *Journal of Hand Surgery, 37A*, 1437-1446.
- Mamun, A. A., O'Callaghan, M. J., Williams, G. M., & Najman, J. M. (2012). Maternal smoking during pregnancy predicts adult offspring cardiovascular risk factors - evidence from a

- community-based large birth cohort study. *Plos One*, 7(7). doi:10.1371/journal.pone.0041106
- Manitoba Centre for Health Policy. (2007). In M. Brownell, R. Santos, & A. Kozyrskj (Eds.), *Next steps in the provincial evaluation of the BabyFirst program: Monitoring early impacts on outcomes associated with child maltreatment*. Winnipeg: University of Manitoba.
- Matone, M., O'Reilly, A. L., Luan, X., Locallo, R., & Rubin, D. M. (2012). Home visitation program effectiveness and the influence of community behavioral norms: A propensity score matched analysis of prenatal smoking cessation. *BMC Public Health*, 12(1016), 1-6. Retrieved April 23, 2013, from <http://www.biomedcentral.com/1471-2458/12/1016>
- Mautner, T. (2000). Epistemology. In *The Penguin dictionary of philosophy* (pp. 174-175). London: Penguin Books.
- Maxwell, J. A., & Mittapalli, K. (2010). Realism as a stance for mixed methods research. In A. Tashakkori & C. Teddlie (Eds.), *Sage handbook of mixed methods in social and behavioral research* (pp. 145-168). Thousand Oaks, California: Sage Publications.
- McCowan, L. M., Dekker, G. A., Chan, E., Stewart, A., Chappell, L. C., Hunter, M., Moss-Morris, R., ... North, R. A. (2009). Spontaneous preterm birth and small for gestational age infants in women who stop smoking early in pregnancy: Prospective cohort study. *British Medical Journal*, 338, b1081.
- McDonald, L. (2010). Florence Nightingale: Passionate statistician. *Journal of Holistic Nursing*, 28(1), 92-98.
- McEvoy, P., & Richards, D. (2006). A critical realist rationale for using a combination of quantitative and qualitative methods. *Journal of Research in Nursing*, 11(1), 66-80.

- McNaughton, D. B. (2000). A synthesis of qualitative home visiting research. *Public Health Nursing, 17*(6), 405-414.
- Mejdoubi, J., van den Heijkant, S., van Leerdam, F., Crone, M., Crijnen, A., & HiraSing, R. A. (2014). Effects of nurse home visitation on cigarette smoking, pregnancy outcomes and breastfeeding: A randomized controlled trial. *Midwifery, 30*, 688-695.
- Merriam, S. (1988). *Case study research in education*. San Francisco: Jossey-Bass.
- Merton, R. K. (1975). Thematic analysis in science: Notes on Holton's concept. *Science, 188*(4186), 335-338.
- Meyerink, R. O., & Marquis, G. S. (2002). Breastfeeding initiation and duration among low-income women in Alabama: The importance of personal and familial experiences in making infant-feeding choices. *Journal of Human Lactation, 18*(1), 38-45.
- Miles, M. B., Huberman, A. M., & Saldana, J. (2014). *Qualitative data analysis* (3rd ed.). Thousand Oaks, California: Sage.
- Monsen, K., & Kerr, M. (2004). Mining quality documentation data for golden outcomes. *Home Health Care Management and Practice, 16*, 192-199.
- Monsen, K., Radosevich, D., Kerr, M., & Fulkerson, J. (2011). Public health nurses tailor interventions for families at risk. *Public Health Nursing, 28*(2), 119-128.
- Montalvo, I. (2007). The national database of nursing quality indicators. *The Online Journal of Issues in Nursing, 12*(3), 1-12.
- Mossman, M., Heaman, M., Dennis, C., & Morris, M. (2008). The influence of adolescent mothers' breastfeeding confidence and attitudes on breastfeeding initiation and duration. *Journal of Human Lactation, 24*(3), 268-277.

- National Center for Chronic Disease Prevention, & Health Promotion. (2014, July). In Centers for Disease Control & Prevention (Eds.), *Breastfeeding report card: United States 2014*. Retrieved March 23, 2017, from [www.cdc.gov](http://www.cdc.gov)
- National Collaborating Centre for Determinants of Health. (2009). *Pan-Canadian inventory of public health early child home visiting* [Key facts and glossary]. Available from [nccdh.ca/images/uploads/TK\\_KeyFactsGlossaryJune25\\_v61.pdf](http://nccdh.ca/images/uploads/TK_KeyFactsGlossaryJune25_v61.pdf)
- Nelson, A., & Sethi, S. (2005). The breastfeeding experiences of Canadian teenage mothers. *Journal of Obstetric, Gynecologic, and Neonatal Nursing, 34*, 615-624.
- Nesbitt, S. A., Campbell, K. A., Jack, S. M., Robinson, H., Piehl, K., & Bogdan, J. C. (2012). Canadian adolescent mothers' perceptions of influences on breastfeeding decisions: A qualitative descriptive study. *BMC Pregnancy and Childbirth, 12*(149), 1-14.
- O'Carroll, P. W., Powell-Griner, E., Holtzman, D., & Williamson, G. D. (2010). Risk factor information systems. In *Public health informatics and information systems* (pp. 316-334). New York: Springer-Verlag.
- O'Connor, A. M., Davies, B. L., Dulberg, C. S., Buhler, P. L., Nadon, C., Hastings McBride, B., & Benzie, R. J. (1992). Effectiveness of a pregnancy smoking cessation program. *Journal of Obstetrical, Gynecologic, and Neonatal Nursing, 21*(5), 385-392.
- Okoli, C., Greaves, L., Bottorff, J. L., & Marcellus, L. M. (2010). Health care providers' engagement in smoking cessation with pregnant smokers. *Journal of Obstetric, Gynecologic, and Neonatal Nursing, 39*(1), 64-77.
- Olds, D. L. (2006). The nurse-family partnership: an evidence-based preventive intervention. *Infant Mental Health Journal, 27*(1), 5-25.

- Olds, D. L., Henderson, C. R., Kitzman, H. J., Eckenrode, J. J., Cole, R. E., & Tatelbaum, R. C. (1999). Prenatal and infancy home visitation by nurses: Recent findings. *The Future of Children, 9*(1), 44-65.
- Olds, D. L., Henderson, C. R., Tatelbaum, R., & Chamberlin, R. (1986). Improving the delivery of prenatal care and outcomes of pregnancy: A randomized trial of nurse home visitation. *Pediatrics, 77*(1), 16-26.
- Olds, D., Kitzman, H., Cole, R., & Robinson, J. (1997). Theoretical foundations of a program of home visitation for pregnant women and parents of young children. *Journal of Community Psychology, 25*(1), 9-25.
- Olds, D., Kitzman, H., Cole, R., Robinson, J., Sidora, K., Luckey, D., Henderson, J., ... Holmberg, J. (2004). Effects of nurse home-visiting on maternal life course and child development: age 6 follow-up results of a randomized trial. *Pediatrics, 114*(6), 1550-1559.
- Olds, D. L., Robinson, J., O'Brien, R., Luckey, D. W., Pettitt, L. M., Henderson, C. R., Ng, R. K., ... Talmi, A. (2002). Home visiting by paraprofessionals and by nurses: A randomized, controlled trial. *Pediatrics, 110*(3), 486-496.
- Olson-Keller, L., Strohschein, S., Lia-Hoagberg, B., & Schaffer, M. (1998). Population-based public health nursing interventions: A model from practice. *Public Health Nursing, 15*(3), 207-215.
- Olson-Keller, L., Strohschein, S., Lia-Hoagberg, B., & Schaffer, M. A. (2004). Population-based public health interventions: Practice-based and evidence-supported. *Public Health Nursing, 21*, 453-468.

- O'Mahoney, J., & Vincent, S. (2014). Critical realism as an empirical project. In *Studying organizations using critical realism* (pp. 1-20). New York: Oxford University Press.
- Parkyn, J. H. (1985). Identification of at-risk infants and preschool children. In W. Frankenburg, R. Emde, & J. Sullivan (Eds.), *Early identification of children at risk: An international perspective* (pp. 203-209). New York: Plenum Press.
- Parlour, B., & McCormack, B. (2012). Blending critical realist and emancipatory practice development methodologies: Making critical realism work in nursing research. *Nursing Inquiry, 19*(4), 308-321.
- Patton, M. (2008). *Utilization-focused evaluation* (4th ed.). Thousand Oaks, California: Sage Publications.
- Pentecost, R., & Grassley, J. S. (2014). Adolescents' needs for nurses' support when initiating breastfeeding. *Journal of Human Lactation, 30*(2), 224-228.
- Perinatal Services B.C. (1997). *Planned maternity discharge following term birth* [Practice guideline]. Available March 28, 2011, from Perinatal Services B.C. Web site: <http://www.perinatalservicesbc.ca>
- Perinatal Services BC. (2011, January). *A guide for the completion of the British Columbia community liaison record - postpartum and newborn* [Perinatal forms guideline 8]. Available April 25, 2013, from Perinatal Services BC Web site: [www.perinatalservicesbc.ca](http://www.perinatalservicesbc.ca)
- Perinatal Services BC. (Ed.). (2015a). *Surveillance perinatal indicators: Annual report*. Retrieved May 27, 2015, from [www.perinatalservicesbc.ca](http://www.perinatalservicesbc.ca)
- Perinatal Services BC. (Ed.). (2015b). *Surveillance perinatal indicators: Quarterly report*. Retrieved April 20, 2017, from [www.perinatalservicesbc.ca](http://www.perinatalservicesbc.ca)

- Polit, D., & Beck, C. (2008). *Nursing Research* (8th ed.). Philadelphia: Lippincott Williams & Wilkins.
- Prochaska, J. O., & DiClemente, C. C. (1985). Common processes of change in smoking, weight control, and psychological distress. In S. Shiffman & T. Wills (Eds.), *Coping and substance abuse* (pp. 345-363). San Diego, CA: Academic Press.
- Public Health Agency of Canada. (2003). *National immunization strategy: A report from the F/P/T advisory committee on population health and health security (ACPHHS)* (Public Health Agency of Canada). Retrieved from <http://www.phac-aspc.gc.ca/publicat/nis-sni-03/index-eng.php>
- Pugh, L. C., Milligan, R. A., Frick, K. D., Spatz, D., & Bronner, Y. (2002). Breastfeeding duration, costs, and benefits of a support program for low-income breastfeeding women. *Birth, 29*(2), 95-100.
- QRS International. (Ed.). (n.d.). *What is NVIVO?* Retrieved April 26, 2017, from [www.qursinternational.com](http://www.qursinternational.com)
- Quinlivan, J. A., Box, H., & Evans, S. F. (2003). Postnatal home visits in teenage mothers: a randomized controlled trial. *Lancet, 361*, 893-900.
- QuitNow.ca. (Ed.). (2017). *How to access free NRT and medications*. Retrieved March 24, 2017, from [www.qn-staging.amirahealth.com](http://www.qn-staging.amirahealth.com)
- Racine, E. F., Frick, K. D., Strobino, D., Carpenter, L. M., Milligan, R., & Pugh, L. C. (2009). How motivation influences breastfeeding duration among low-income women. *Journal of Human Lactation, 25*(2), 173-181.
- Raisler, J. (2000). Against the odds: Breastfeeding experiences of low income mothers. *Journal of Midwifery and Women's Health, 45*(3), 253-263.

- Raisler, J., Alexander, C., & O'Campo, P. (1999). Breast-feeding and infant illness: A dose-response relationship? *American Journal of Public Health, 89*(1), 25-30.
- Randall, S. M., Ferrante, A. M., Boyd, J. H., & Semmens, J. B. (2013). The effect of data cleaning on record linkage quality. *Biomed Central, 13*(64), 1-10.
- Raphael, D. (Ed.). (2004). *Social determinants of health: Canadian perspectives*. Toronto, Ontario: Canadian Scholars' Press.
- Ratner, P. A., Johnson, J. L., Bottorff, J. L., Dahinten, S., & Hall, W. (2000). Twelve-month follow-up of a smoking relapse prevention intervention for postpartum women. *Addictive Behaviors, 25*(1), 81-92.
- Renfrew, M. J., McCormick, F. M., Wade, A., Quinn, B., & Dowswell, T. (2012). Support for healthy breastfeeding mothers with healthy term babies. *Cochrane Database of Systematic Reviews, 5*.
- Risjord, M. (2010). *Nursing knowledge: science, practice, and philosophy*. Chichester, United Kingdom: John Wiley & Sons Ltd.
- Robling, M., Bekkers, M., Bell, K., Butler, C. C., Cannings-John, R., Channon, S., Martin, B. C., ... Richardson, G. (2015). Effectiveness of a nurse-led intensive home-visitation programme for first-time teenage mothers (Building Blocks): A pragmatic randomized controlled trial. *Lancet, 387*, 146-155.
- Rodgers, Beth L. (2005). *Developing nursing knowledge: Philosophical traditions and influences*. Philadelphia: Lippincott Williams & Wilkins.
- Roll, C. L., & Cheater, F. (2016). Expectant parents' view of factors influencing infant feeding decisions in the antenatal period: A systematic review. *International Journal of Nursing Studies, 60*, 145-155.

- Rosenthal, D. G., & Weitzman, M. (2011). Examining the effects of intrauterine and postnatal exposure to tobacco smoke on childhood cognitive and behavioral development. *International Journal of Mental Health, 40*(1), 39-64.
- Rumay Alexander, G. (2007). Nursing sensitive databases. *Medical Care Research and Review, 64*(2), 44s-63s.
- Saldana, J. (2013). *The coding manual for qualitative researchers* (2nd ed.). London: Sage.
- Salihu, H. M., & Wilson, R. E. (2007). Epidemiology of prenatal smoking and perinatal outcomes. *Early Human Development, 83*, 713-720.
- Salkind, N. J. (2010). Data cleaning. In *Encyclopedia of research design* (pp. 326-329). Retrieved June 26, 2014, from [knowledge.sagepub.com.ezproxy.library.uvic.ca/view/researchdesign/n100.xml](http://knowledge.sagepub.com.ezproxy.library.uvic.ca/view/researchdesign/n100.xml)
- Sallis, J. F., Owen, N., & Fisher, E. B. (2008). Ecological models of health behavior. In K. Glanz, B. K. Rimer, & K. Viswanath (Eds.), *Health behavior and health education: Theory, research, and practice* (4th ed., pp. 465-86). San Francisco: Jossey-Bass.
- Sandelowski, M. (2014). Unmixing mixed-methods research. *Research in Nursing and Health, 37*, 3-8.
- Sayer, A. (1992). *Method in social science: A realist approach* (2nd ed.). London: Routledge.
- Sayer, A. (2000). *Realism and social science*. London: Sage Publications Ltd.
- Schaffer, M. A., Goodhue, A., Stennes, K., & Lanigan, C. (2012). Evaluation of a public health nursing visiting program for pregnant and parenting teens. *Public Health Nursing, 29*(3), 218-231.
- Schaffer, M. A., & Mbibi, N. (2014). Public health nurse mentorship of pregnant and parenting adolescents. *Public Health Nursing, 31*(5), 428-437.

- Schiller, C. J. (2016). Critical realism in nursing: An emerging approach. *Nursing Philosophy*, 17, 88-102.
- Schim, S. M., Benkert, R., Bell, S. E., Walker, D. S., & Danford, C. A. (2006). Social justice: Added metaparadigm concept for urban health nursing. *Public Health Nursing*, 24, 73-80.
- Shah, M. K., & Austin, K. R. (2014). Do home visiting services received during pregnancy improve birth outcomes? Findings from Virginia PRAMS 2007-2008. *Public Health Nursing*, 31(5), 405-413.
- Shearer, J. E. (2016). A critical caring theory of protection for migrants and seasonal farm workers. *Public Health Nursing*, 1-10. DOI: 10.1111/phn.12304
- Shortt, E., McGorrian, C., & Kelleher, C. (2013). A qualitative study of infant feeding decisions among low-income women in the Republic of Ireland. *Midwifery*, 29, 453-460.
- Smaldone, A. M., & Connor, J. A. (2003). The use of large administrative data sets in nursing research. *Applied Nursing Research*, 16(3), 205-207.
- Smith, D., Van Herk, K., & Rahaman, Z. (2012). Primary health care. In L. Stamler & L. Yiu (Eds.), *Community health nursing: A Canadian perspective* (pp. 109-123). Toronto, Ontario: Pearson.
- SmithBattle, L., Diekemper, M., & Leander, S. (2004). Getting your feet wet: Becoming a public health nurse, part 1. *Public Health Nursing*, 21(1), 3-11.
- Stake, R. (1995). *The art of case study research*. Thousand Oaks, California: Sage Publications.
- Statistics Canada. (Ed.). (2013, November 2). *Smoking 2011*. Retrieved March 23, 2017, from [www.statcan.gc.ca](http://www.statcan.gc.ca)

- Strathearn, L., Mamun, A. A., Najman, J. M., & O'Callaghan, M. J. (2009). Does breastfeeding protect against substantiated child abuse and neglect? A 15 year cohort study. *Pediatrics*, *123*(2), 483-493.
- Su, A., & Buttenheim, A. M. (2014). Maintenance of smoking cessation in the postpartum period: Which interventions work best in the long term? *Maternal Child Health Journal*, *18*, 714-728.
- Swanson, V., & Power, K. G. (2005). Initiation and continuation of breastfeeding: Theory of planned behaviour. *Journal of Advanced Nursing*, *50*(3), 272-282.
- Swanson, V., Power, K., Kaur, B., Carter, H., & Shepherd, K. (2005). The impact of knowledge and social influences on adolescents' breast-feeding beliefs and intentions. *Public Health Nutrition*, *9*(3), 297-305.
- Teddlie, C., & Tashakkori, A. (2010). Overview of contemporary issues in mixed methods research. In A. Tashakkori & C. Teddlie (Eds.), *The Sage handbook of mixed methods in social and behavioral research* (2nd ed., pp. 1-44). Thousand Oaks, CA: Sage Publications.
- Thompson, G. (2016, June 6). In Canadian Paediatric Society (Ed.), *Meeting the needs of adolescent parents and their children*. Retrieved April 1, 2017, from [www.cps.ca](http://www.cps.ca)
- Tomoaia-Cotisel, A., Scammon, D. L., Waitzman, N. J., Cronholm, P. F., Halladay, J. R., Driscoll, D. L., Solberg, L. I., ... Stange, K. C. (2013). Context matters: The experience of 14 research teams in systematically reporting contextual factors important for practice change. *Annals of Family Medicine*, *11*, S115-S123.
- Torraco, R. J. (2005). Writing integrative literature reviews: Guidelines and examples. *Human Resource Development Review*, *4*(3), 356-367.

- Tough, S., Johnston, D., Siever, J., Jorgenson, G., Slocombe, L., Lane, C., & Clarke, M. (2006). Does supplementary prenatal nursing and home visitation support improve resource use in a universal health care system? A randomized controlled trial in Canada. *Birth: Issues in Perinatal Care*, 33(3), 183-194.
- Underwood, J. M., Mowat, D. L., Meagher-Stewart, D. M., Deber, R. B., Baumann, A. O., MacDonald, M. B., Akhtar-Danesh, N., ... Munroe, V. J. (2009). Building community and public health nursing capacity: A synthesis report of the national community health nursing study. *Canadian Journal of Public Health*, 100(5), I1-I11.
- Unicef United Kingdom. (Ed.). (n.d.). *Breastfeeding rates in the UK*. Retrieved April 27, 2017, from [www.unicef.org.uk](http://www.unicef.org.uk)
- Unluer, S. (2012). Being an insider researcher while conducting case study research. *The Qualitative Report*, 17, 1-14.
- U.S. Department of Health, & Human Services. (2014). *The health consequences of smoking - 50 years of progress* (A report of the Surgeon General). Atlanta, GA: Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health.
- Vancouver Island Health Authority. (Ed.). (2007, June). *What you should know about the collection of your personal information*. (Available from Vancouver Island Health Authority)
- Vancouver Island Health Authority. (Ed.). (2014, March). Caring for your information: Notice to our patients, clients, and residents. Retrieved April 4, 2017, from [www.viha.ca](http://www.viha.ca)
- VanWynsberghe, R., & Khan, S. (2007). Redefining case study. *International Journal of Qualitative Methods*, 6(2), 80-94.

- Vincent, S., & Wapshott, R. (2014). Critical realism and the organizational case study. In P. K. Edwards, J. O'Mahoney, & S. Vincent (Eds.), *Studying organizations using critical realism* (pp. 148-167). New York: Oxford University Press.
- Wainwright, S. P. (1997). A new paradigm for nursing: The potential of realism. *Journal of Advanced Nursing*, 26, 1262-1271.
- Wambach, K. A., & Cohen, S. M. (2009). Breastfeeding experiences of urban adolescent mothers. *Journal of Pediatric Nursing*, 24(4), 244-254.
- Watson, J. (2012). *Human caring science* (2nd ed.). Sudbury, MA: Jones & Bartlett Learning. (Original work published 1999)
- Weiss, H. B. (1993). Home visits: Necessary but not sufficient. *The Future of Children*, 3(3), 113-128.
- West, C., Stewart, L., Foster, K., & Usher, K. (2013). Accidental insider: Living the PhD study. *Collegian*, 20, 61-65.
- Weston, C., Gandell, T., Beauchamp, J., McAlpine, L., Wiseman, C., & Beauchamp, C. (2001). Analyzing interview data: The development and evolution of a coding system. *Qualitative Sociology*, 24(3), 381-400.
- Whitehead, M. (1992). The concepts and principles of equity in health. *Health Promotion International*, 6(3), 217-228.
- Whitehead, M., & Dahlgren, G. (2006). *Concepts and principles for tackling social inequities in health: Leveling up part 1* (WHO Collaborating Centre for Policy Research on Social Determinants of Health). Retrieved August 21, 2014, from [http://www.enothe.eu/cop/docs/concepts\\_and\\_principles.pdf](http://www.enothe.eu/cop/docs/concepts_and_principles.pdf)

- Whittemore, R., & Knafl, K. (2005). The integrative review: Updated methodology. *Journal of Advanced Nursing*, 52(5), 546-553.
- Wigginton, B., & Lee, C. (2013). A story of stigma: Australian women's accounts of smoking during pregnancy. *Critical Public Health*, 23(4), 466-481. doi:10.1080/09581596.2012.753408
- Windle, P. E. (2010). Secondary data analysis: Is it useful and valid? *Journal of Perianesthesia Nursing*, 25(5), 322-324.
- World Health Organization. (n.d.). *Immunization*. Retrieved from [www.who.int/topics/immunization/en/](http://www.who.int/topics/immunization/en/)
- World Health Organization. (1986). In World Health Organization (Ed.), *The Ottawa charter for health promotion*. Retrieved April 1, 2015, from World Health Organization Web site: [www.who.int/healthpromotion/conferences/previous/ottawa/en/index3.html](http://www.who.int/healthpromotion/conferences/previous/ottawa/en/index3.html)
- World Health Organization. (1997, July). *Jakarta declaration on health promotion into the 21st century* (Division of health promotion, education and communication CH-1211). Retrieved August 21, 2014, from <http://www.who.int/healthpromotion/conferences/previous/jakarta/declaration/en/>
- World Health Organization. (2005). *The Bangkok charter for health promotion in a globalized world* (6th Global conference on health promotion). Geneva, Switzerland: World Health Organization.
- World Health Organization. (2009). *Nairobi call to action for closing the implementation gap in health promotion* (7th Global conference on Health Promotion). Geneva, Switzerland: World Health Organization.

World Health Organization. (Ed.). (2017). *The World Health Organization's infant feeding recommendation*. Retrieved March 20, 2017, from [www.who.int/nutrition/topics/infantfeeding\\_recommendation/en/](http://www.who.int/nutrition/topics/infantfeeding_recommendation/en/)

World Health Organization/UNICEF. (1990). *Innocenti Declaration* (World Health Organization). Retrieved from <http://www.un.unicef.org/programme/breastfeeding/innocenti.htm>

World Health Organization, UNICEF., & Wellstart International. (Eds.). (2009). *Baby-friendly hospital initiative: Revised updated and expanded for integrated care*. Retrieved April 12, 2017, from [www.apps.who.int](http://www.apps.who.int)

Wuest, J. (2012). Grounded theory: The method. In P. L. Munhall (Ed.), *Nursing research* (5th ed., pp. 225-256). Mississauga, Ontario: Jones & Bartlett Learning.

Yin, R. K. (2009). *Case study research design and methods* (4th ed.). Thousand Oaks, California: Sage Publications.

## Appendix A

**Key Research Articles Summary Table**

Source	Purpose	Sample	Theoretical Framework	Methodology and Intervention	Key Findings	Strengths	Weaknesses	Comments / Critique
<b>Breastfeeding</b>								
<p>Armstrong, Fraser, Dadds, &amp; Morris, 2000. Repeated in the Immunization section.</p> <p>Australia</p>	<p>The aim of this trial was to assess the effectiveness of home-based interventions for vulnerable postnatal families. The focus was primarily on maternal-infant interaction, although other preventive health measures were also examined including immunizations, smoking, and breastfeeding.</p>	<p>181 families, with 90 randomly assigned to the intervention group, and 91 to the control group.</p>	<p>Not discussed.</p>	<p>This randomized controlled trial involved a structured program of visits from child health nurses with a program focus similar to that of BC PHNs, including establishment of a trusting relationship, enhancement of parental confidence and self-esteem, anticipatory guidance, promotion of preventive health care, and facilitation of access to other community services. 3 months duration. Multips and primps involved.</p>	<p>Breastfeeding rates between the two groups did not show any difference. Findings indicated a significant difference in immunization rates with the intervention group having a higher mean number of completed immunizations. A significant difference was found in parental smoking behaviour with fewer of the intervention group smoking inside the house.</p>	<p>A number of outcomes were measured in this study, reflecting a broad range of nursing involvement more typical of PHN practice compared to single focus studies. The tools used to measure these outcomes were well described. Qualitative commentary from participants indicated that the development of a trusting relationship in a home environment where the client felt both comfortable and in control was the focus of the intervention.</p>	<p>Part of this study involved a researcher coming into the home of all participants to collect data based on a variety of tools. These visits ranged from 45-110 minutes, and occurred at three times during the course of the research. There was no discussion about the possible effects of this involvement, other than to say that the researcher did not provide healthcare. However, it could have influenced the parents in making more visits to the health centre for immunizations. No discussion was provided about the nature of routine clinic visits and the range of information and support that might have been given. It was noted that 35% of the control mothers attended the clinic on a regular basis, and that 20% attended 7 or more times. Although there was self-reporting of changes in smoking behaviour, actual rates of tobacco reduction or cessation were not included in this study. Discussion about routine PHN services, available community resources, and caseload expectations for</p>	<p>Despite some of the shortcomings of the methodology, the findings supported the broad range of PHN activities, and highlighted the importance of the trusting relationship between the nurse and the participants.</p>

Source	Purpose	Sample	Theoretical Framework	Methodology and Intervention	Key Findings	Strengths	Weaknesses	Comments / Critique
							intervention nurses were not included.	
Chapman & Perez-Escamilla, 2012  U.S.A	To identify and evaluate U.S. based randomized trials evaluating breastfeeding interventions for minorities, and to highlight effective public health approaches for minimizing breastfeeding disparities.	18 randomized trials	Not discussed.	A critical review of randomized trials evaluating breastfeeding interventions related to minority or low-income women.	A range of interventions were found to improve breastfeeding initiation and duration, however postpartum support delivered by nurses alone was a less effective type of intervention compared to peer counseling, group education, breastfeeding clinic support, or supplemental nutrition programs.	The combined results of 18 studies showed promising results with a range of intervention approaches.	The focus of this review was on ethnic minorities and not low-income, teen, or women in other risk categories. No studies were included that examined outcomes in Native American or Asian populations. This review included a range of peer and professional support personnel, not just PHNs.	This review did not discuss the nature of the nursing interventions, nor the level of training nurses had. Nor did this review discuss the effect of community culture, and how a range of informal community supports may have affected their findings.
Cricco-Lizza, 2006  U.S.A.	To describe strategies that can be used in research on breastfeeding disparities.	130 Black, non-Hispanic mothers in a New York WIC clinic.	Not discussed	Ethnographic study of low-income black women, through interviews regarding infant feeding education and support from nurses and physicians. 11 women were followed in depth to one year postpartum through numerous contacts.	The fostering of a trusting relationship with nurses was identified. Personal connections with health care professionals were trusted and valued, although in this particular community women found limited breastfeeding education and support from nurses and physicians during the childbearing period.			This study did not discuss the nature of community health supports, or the nature of the breastfeeding culture in that particular community.

Source	Purpose	Sample	Theoretical Framework	Methodology and Intervention	Key Findings	Strengths	Weaknesses	Comments / Critique
Dyson, Green, Renfrew, McMillan, & Woolridge, 2010  UK	To identify factors for women 19 years and younger from disadvantaged groups that were most influential on infant feeding plans, and to provide contextual insight into the meaning of those factors.	71 primip teens	Theory of planned behaviour	Mixed methods study, using a quantitative questionnaire, regarding views and intentions related to infant feeding, along with 4 focus groups seeking contextual insight from 17 participants of naturally occurring health education programs.	Breastfeeding was viewed as morally inappropriate by most of these teens. The attitude that breastfeeding would be embarrassing was an important factor in the infant feeding decision. Negative moral judgment appeared to create a culture of resistance and hostility toward breastfeeding mothers.	The exploration of attitudes and cultural norms related to infant feeding contributed to the broader understanding of the context involved in infant feeding decisions.	Sample sizes were small	Overall breastfeeding rates in the UK at this time were as low as 51%, and this may have influenced community culture related to breastfeeding.
Fetrick, Christensen, & Mitchell, 2003  U.S.A.	To determine if PHN home visits made a difference in the health outcomes of low-income, high-risk prenatal mothers. Tobacco use and breastfeeding were two of the outcomes examined.	55 prenatal clients	Not discussed	Retrospective chart review of 55 low-income, high-risk pregnant women, in Nebraska. Intervention was PHN home visits based on groupings of 4 or fewer visits, compared to 5 or more visits	More breastfeeding was recorded for mothers receiving more PHN visits.	The use of a chart review in an established PHN program provided a reflection of the day-to-day practice of PHNs. The use of a chart review also helped to highlight areas of charting definition and consistency.	No results were provided about changes to maternal tobacco use relative to PHN visits despite it being listed as one of the health outcomes being followed. Sample size was limited. Benchmarks of community breastfeeding and tobacco rates were not included. The categories examined included 'fewer visits (<5)' or 'more visits (.5)', which did not provide enough information.	No mention was made about the nature of the PHN visits, other than the number, nor was there any discussion about PHN organizational support, education, or caseload expectations.
Grassley, 2010  U.S.A.	To define aspects of social support from nurses for adolescent mothers when initiating breastfeeding	18 studies	Social support as defined by House (1981) and based on five dimensions of social support.	Synthesized review of studies related to adolescents and breastfeeding support needs.	Nurses can have a positive impact on breastfeeding support. Network support is essential along with information, instrumental, emotional and esteem support for this population.	The review identified supportive nurse behaviours important for practice.	Used only Medline and CINAHL databases. A broader search may have resulted in more studies. No discussion was included describing the process for assessing search results for inclusion in the review.	This review did not focus solely on PHNs, but included hospital RNs as well.

Source	Purpose	Sample	Theoretical Framework	Methodology and Intervention	Key Findings	Strengths	Weaknesses	Comments / Critique
Kemp et al., 2011 Australia	“To investigate the impact of a long-term nurse home visiting program... on the health, development and wellbeing of the child, mother, and family.” P.533.	208 at risk, socially disadvantaged mothers. 111 in the intervention group, and 97 in the control group.	Not discussed	Randomized controlled trial compared a long-term nurse home visiting program embedded within a universal system for child health with the usual universal care. Study duration: 2 years	Results showed longer breastfeeding duration for the women with long-term nurse follow-up. No differences were noted with immunizations or smoking cessation.	Missing data process was clearly explained. Risk factors for participants were clearly outlined. Tools used to measure primary outcomes were identified, although reliability and validity of these tools was assumed and not discussed.	Randomization procedures were not discussed. Sample size was small, with no power analysis discussed. Only 3 PHNs were involved, and no discussion about PHN training for this program.	Information about usual care was not provided. Nor was there any discussion of other caseload demands for PHNs. Breastfeeding, immunizations, and smoking were secondary outcomes, with primary outcomes being quality of home environment, parent-child interaction, and child development. Results were compared with the control group, but not with the larger community population.
Kurtz Landy, Jack, Wahoush, Sheehan, & MacMillan, 2012 Canada	To explore mothers’ experiences with the Nurse-Family Partnership program,	18 low-income, young, first time mothers in Ontario.	Not discussed in this article, however NFP is based on Bandura’s self efficacy theory, Human Ecology Theory, and Attachment Theory.	Qualitative case study using in-depth interviews using a purposeful sample. Content analysis was used to analyze interviews and field notes.	Highlighted the critical importance of the nurse-client relationship. Issues of respect, non-judgmental approach, and empowerment were important to young mothers. Felt the nurses were engaged and interested in them as individuals, felt they became friends.	Descriptions and observations of the interview context were documented in field notes by researchers, and an audit trail was maintained. These field notes were included in the content analysis process.	This study was limited to first time mothers rather than young mothers who already had parenting experience. The use of a purposeful sample of women may have selected for those who were more interested in participating in the program. Views of those women who dropped out were not included.	The NFP program involves limited PHN caseloads, limited target audience, additional PHN education and supervision than normally found in routine PHN practice.
Mejdoubi, van den Heijkant, van Leerdam, Crone, Crijnen, & HiraSing, 2014. Netherlands  Repeated below in the tobacco section.	To assess the VoorZorg (NFP) programme compared to usual care in reducing smoking. Effects on breastfeeding were also monitored.	460 participants with 223 in the control group and 237 in the intervention group.	Human ecology theory, self-efficacy theory, and attachment theory.	Single blind, parallel-group randomized controlled trial	A higher percentage of women in the intervention group were still breastfeeding at 6 months. The program was effective in reducing smoking prenatally and postnatally.	Although there was a national program for smoking cessation in pregnancy already in place, the intervention group showed better results than the control/usual care group.	This study only included primips. Self-report questionnaires were used to assess smoking levels. Cotinine levels were not measured due to time and financial constraints. There was a high non-response rate among the control group, which may have biased the results.	This article did not describe the normal range of Midwife activities, so the similarities to PHN work could not be directly assessed, however it appears that there are many similarities in the nature of the home visiting component. The Midwife focus was entirely 1:1 based, and did not involve community level activities.

Source	Purpose	Sample	Theoretical Framework	Methodology and Intervention	Key Findings	Strengths	Weaknesses	Comments / Critique
					Those who continued to smoke smoked fewer cigarettes per day, and less around the baby.			
Nesbitt, Campbell, Jack, Robinson, Piehl, & Bogdan, 2012  Canada	“To examine the facilitating influences and barriers to initiating, and continuing breastfeeding” in adolescent mothers.	16 adolescent mothers	Theory of planned behaviour, and House’s (1981) social support theoretical framework.	Qualitative, interpretive description based on semi-structured interviews with a purposeful sample of 16 adolescent mothers.	Implications for nurses included the active engagement of teens in the pre and postnatal periods to link young mothers to supportive networks and community resources and to provide positive reinforcement of breastfeeding knowledge, skills, and successes.		Use of a purposeful convenience sampling limited the scope of experiences discussed by teens. As well most were primips and over the age of 16, which also limits the range of experience.	Includes both hospital nurses as well as PHNs.
Nelson & Sethi, 2005  Canada	To study first-time breastfeeding experiences of teen mothers.	8 teen mothers	Grounded theory approach.	Grounded theory using an informal interview format and demographic questionnaire.	Recognition of various phases that teen mothers go through. Highlighted the need for sensitive and relevant care for teens within their individual social context. They found breastfeeding support from health professionals to be highly valuable. Health professionals need to be personal in working with these mothers, need to take time, be patient, listen carefully, and be understanding.			Participants self-referred to this study, which suggests they were positively biased toward breastfeeding. A majority of these mothers were white, and living with partners, which may not be reflective of a broader population of teen mothers.

Source	Purpose	Sample	Theoretical Framework	Methodology and Intervention	Key Findings	Strengths	Weaknesses	Comments / Critique
<p>Olds, Henderson, Tatelbaum, &amp; Chamberlin, 1986;</p> <p>U.S.A.</p> <p>Repeated in the tobacco section.</p>	<p>To evaluate the effectiveness of the NFP program in New York state.</p>	<p>400 women</p>	<p>Human ecology theory; self-efficacy theory; attachment theory (Olds, Kitzman, Cole, &amp; Robinson, 1997).</p>	<p>Randomized clinical trial using 4 different treatment approaches involving PHNs and home visiting, and focusing on young, poor, first time mothers.</p>	<p>75% reduction in the incidence of low birth weight among women who smoked and who were visited by PHNs. Compared to the comparison group, Nurse-visited smokers smoked fewer cigarettes, and serum cotinine measures showed that nurse-visited smokers were more accurate in their reports. Overall there was improved use of community services, health habits, and informal social support.</p>	<p>Randomization process was clearly outlined and adequate to ensure equal representation in each of the four groups. Serum cotinine levels were used to verify self-report of smoking. A wide range of variables was included in the analysis.</p>	<p>Sample was limited to primip teens, and not multips of lower socioeconomic status. Some teens included were not of low socioeconomic status, and some subjects were more than 25 weeks gestation. Power analysis was not discussed. Sociodemographic and health characteristics were equal among the 4 groups, however there were differences with regard to levels of social support.</p>	<p>Information about PHN training, supervision levels, caseload range and intensity were not discussed, nor were the normal characteristics of nurses providing the usual service. This was grant-funded research and did not reflect the influence of a broader range of PHN duty. Data collection involved more than routine client documentation.</p>
<p>Pentecost &amp; Grassley, 2014</p> <p>U.S.A.</p>	<p>To explore the needs of teen mothers for social support from nurses when initiating breastfeeding.</p>	<p>90 adolescents</p>	<p>House's theory of social support.</p>	<p>Secondary qualitative content analysis of a scale designed to measure teen mothers' perceptions of nurse's support for breastfeeding. This also included adolescent's responses to questions about what things the nurses did that helped them breastfeed, and anything they wished the nurses would have done to help them with breastfeeding.</p>	<p>This study reinforced the important role that nurses play in supporting teen mothers to breastfeed. Teens wanted nurses to take time to answer questions and concerns, to engage in dialogue based on what they already knew, they wanted accurate and consistent information, as well as practical support for the mechanics of breastfeeding.</p>	<p>Two researchers independently read and coded all responses, and collaboratively discussed individual findings, as well as consulting with the literature to establish credibility of results. Theoretical foundations clearly informed analysis of results.</p>	<p>The literature review for this study was not well developed, and recruitment of participants was not discussed. Details regarding the data collection procedure were not included.</p>	<p>Although nurses in this study were from a postpartum unit in 3 urban hospitals in the US, there was no discussion about the normal length of stay or the use of PHNs. However, the concerns of young mothers would remain the same for any nursing support.</p>

Source	Purpose	Sample	Theoretical Framework	Methodology and Intervention	Key Findings	Strengths	Weaknesses	Comments / Critique
					Embarrassment was identified as a significant barrier to breastfeeding.			
Pugh, Milligan, Frick, Spatz, & Bronner, 2002. U.S.A.	To evaluate CHN/peer counselor intervention to increase breastfeeding duration in low-income mothers.	41 mothers	Not discussed	Community based randomized clinical trial involving low-income mothers over 6 months, based on “usual” care, versus home visits and phone support by PHNs and peer counselors.	Breastfeeding duration was increased with PHN and peer support.	Literature review was well laid out and quite thorough.	Interviews as a data collection method could be considered an intervention, given their frequency. 41 mothers was a small sample size for an RCT. There was no discussion of power analysis.	“Usual” method of care not discussed in relation to PHN caseloads, other job duties, or organizational context. No discussion of “usual” PHN or peer training or supervision
Quinlivan, Box, & Evans, 2003  Australia  Repeated below in the immunization section.	To assess the effect of postnatal home visiting to teen mothers by certified nurse-midwives in reducing adverse neonatal outcomes, and improving maternal knowledge about immunizations schedules, breastfeeding, and contraception.	136 adolescents with 65 in the intervention group, and 71 in the control group.	Not discussed	Randomized controlled trial involving nurse-midwives. Data was collected through participant questionnaires, and immunization and breastfeeding information was verified against medical records, and analyzed through statistical analysis.	Study results showed no significant difference between groups in relation to immunizations or breastfeeding rates at 6 months postpartum The authors of this study suggest that home visiting is not effective in improving breastfeeding knowledge or duration	Sample size was based on power analysis showing the need for at least 60 participants in each group. Use of Anova to control for effects of factors that might affect knowledge outcomes, for example: age, social class. Social class scores were based on a combination of participant’s education level, their parent’s education level, and family income. Randomization to the two groups was done with a computer program. Immunization data was verified against the National Immunization Register. Breastfeeding data was verified against medical records.	The study population was limited to first time teen mothers, not multips. There was no discussion of what was involved with routine postnatal follow-up for both groups. The intervention was limited to 5 structured home visits. There was no discussion of the breastfeeding knowledge and skills of the intervention nurse.	The nature of the intervention home visit protocol was very similar to the kinds of things routinely done by PHNs in BC, including teaching about infant feeding, immunizations, and contraception, as well as providing advice, support, and information regarding a range of health issues, and also referrals to other community services including community health nurses. This study did not provide any information about community rates of immunization, nor about the cost or availability of vaccines. Community breastfeeding levels were also not discussed, which may have influenced the lack of significant differences between the groups.
Raisler, (2000) U.S.A	To explore the breastfeeding experiences of low-income mothers in order to gain insights about better breastfeeding support for	Seven focus groups involving a convenience sample of 42	Not discussed	Qualitative study with seven focus groups involving a convenience sample of 42, low-income mothers were asked about breastfeeding support within and beyond the healthcare system.	Key findings included information about care providers that were helpful included their knowledge of breastfeeding, establishment of supportive relationships, enthusiasm for	These mothers were already involved in the WIC program and so may have had a certain perspective toward breastfeeding and healthcare providers.	None of these mothers were formula feeding so the perspective of those mothers is missing from this study. As well, focus groups can sometimes inhibit open and frank discussion, especially if care providers are present.	Many of the findings are useful for PHNs and others providing care for breastfeeding mothers.

Source	Purpose	Sample	Theoretical Framework	Methodology and Intervention	Key Findings	Strengths	Weaknesses	Comments / Critique
	this population of women.				breastfeeding, appropriate referrals, making home visits, and help with actual breastfeeding problems throughout the perinatal period. Unhelpful actions included missed opportunities to talk about breastfeeding, misinformation, encouragement of formula, perfunctory care, and difficulties accessing care.			
Shah & Austin, 2014, U.S.A.	To determine if women who participated in a home visiting program during pregnancy had better birth outcomes than women who did not participate.	407 women, involving 107 in the home visited group and 300 in the comparison group.	Not discussed.	Secondary data analysis of Virginia PRAMS data, involving at risk women who had been part of a prenatal home visiting program.	Results showed that home visiting services during pregnancy was associated with an increase in breastfeeding initiation.	The use of data from PRAMS allowed for comparison with all births. Inclusion of women in the comparison group who were eligible, but not taking part in some social and health programs, served to eliminate the positive effects of those programs.	Background literature review for this article was disjointed and difficult to follow. Details of the questionnaire and telephone interview questions were not included. The comparison group was almost three times the size of the home visited group. Details on the type of visiting programs; the length of participation or frequency of visits was unknown.	Because the home visiting programs were not described, they may have included both PHNs as well as others.
Tough, S., Johnston, D., Siever, J., Jorgenson, G., Slocombe, L., Lane, C., & Clarke, M. (2006) Canada <u>Repeated below in the tobacco section.</u>	To examine the impact of additional prenatal care on resource use.	1352 women	The theoretical foundations of the study were not directly discussed, however nurses received training in several theoretical approaches including: -Human perspective on learning	Randomized controlled trial involving standard physician care, standard care plus consultation with a nurse, or the addition of a trained lay home visitor in addition to the first two categories.	Additional supports can improve information needs and use of community-based resources, however no changes in smoking rates were found. No discussion of breastfeeding rates, although use	Randomization process was clearly explained. Nurses discussed a range of health topics with participants. Assessment tools were clearly outlined, as was the development of the questionnaire. Comparison was made between women with risk characteristics, and women without risk.	Recruitment occurred at one of 3 physician run maternity clinics, so there was concern that the standard of practice might change with the introduction of an intervention, which might affect the interpretation of outcomes in this RCT. An assessment study was done prior to the RCT, using a questionnaire about care and information received at	Although the nurses involved were PHNs, they were involved only with the research project and did not have the full range of PHN job duties competing for their time. As well, this was a time-limited study, which did not involve the development of broader community supports. Women under 18 were excluded.

Source	Purpose	Sample	Theoretical Framework	Methodology and Intervention	Key Findings	Strengths	Weaknesses	Comments / Critique
			-Competency-based approach to pregnancy care -Solution focused counseling -Community as partner approach from the Neuman caregiving model		of breastfeeding support was included among the resources used by participants.	Power analysis was discussed.	the clinic. Results showed an increase in information support by clinic staff for all participants. Primip/multip status of participants was unclear. Findings referred to younger women, but those under 18 were excluded from the study.	The intervention period extended just to one week after the birth of the baby, and did not include postnatal care, and consequently rates of breastfeeding and smoking were not included in this study.
<b>Tobacco</b>								
Albrecht et al., 2006. U.S.A.	To examine the effects of two smoking cessation interventions compared to the usual care.	142 primip teens without any complications of pregnancy	Cognitive behavioral theory, and Jessor's problem behavior theory.	Randomized controlled trial following teens for one year. The interventions consisted of an eight-week group session, with one group involving a non-smoking support buddy. Masters prepared registered nurses who also received additional training related to the program facilitated the groups.	Although there were significant differences between the usual care group and one of the interventions eight weeks following the group sessions, by one year following study entry there were no differences between groups.	A thorough discussion of recruitment procedures was included. Self-reported smoking status was confirmed by saliva cotinine and saliva nicotine measures. Validity of the smoking history questionnaire was well discussed, as were the tools used to measure the descriptive variables relevant to the theoretical foundations. Demographic data regarding the groups was well covered.	Sample size for the power analysis was not achieved due to difficulties with following participants, and therefore limited in generalizability.	Nurses who were not necessarily PHNs participated in this study. The focus was only on smoking cessation, and not on other perinatal health issues. The intervention was just the 8 group sessions and did not involve any ongoing follow-up or relationship development between participants and a nurse after the group sessions were completed.
Armstrong, Fraser, Dadds, & Morris, 2000.  Australia Repeat	The aim of this trial was to assess the effectiveness of home-based interventions for vulnerable postnatal families. The focus was primarily on maternal-infant interaction, although other preventive	181 families, with 90 randomly assigned to the intervention group, and 91 to the control group.	Not discussed.	This randomized controlled trial involved a structured program of visits from child health nurses with a program focus similar to that of BC PHNs, including establishment of a trusting relationship, enhancement of parental confidence and self-esteem, anticipatory guidance, promotion of preventive health care, and facilitation of	Breastfeeding rates between the two groups did not show any difference. Findings indicated a significant difference in immunization rates with the intervention group having a higher mean number of completed immunizations. A significant difference was found in parental	A number of outcomes were measured in this study, reflecting a broad range of nursing involvement more typical of PHN practice compared to single focus studies. The tools used to measure these outcomes were well described. Qualitative commentary from participants indicated that the development of a trusting relationship in a home environment where the client felt both comfortable and in control	Part of this study involved a researcher coming into the home of all participants to collect data based on a variety of tools. These visits ranged from 45-110 minutes, and occurred at three times during the course of the research. There was no discussion about the possible effects of this involvement, other than to say that the researcher did not provide healthcare. However, it could have influenced the parents in making more visits to the health centre	Despite some of the shortcomings of the methodology, the findings supported the broad range of PHN activities, and highlighted the importance of the trusting relationship between the nurse and the participants.

Source	Purpose	Sample	Theoretical Framework	Methodology and Intervention	Key Findings	Strengths	Weaknesses	Comments / Critique
	health measures were also examined including immunizations, smoking, and breastfeeding.			access to other community services.	smoking behaviour with fewer of the intervention group smoking inside the house.	was the focus of the intervention.	for immunizations. No discussion was provided about the nature of routine clinic visits and the range of information and support that might have been given. It was noted that 35% of the control mothers attended the clinic on a regular basis, and that 20% attended 7 or more times. Although there was self-reporting of changes in smoking behaviour, actual rates of tobacco reduction or cessation were not included in this study. Discussion about routine PHN services, available community resources, and caseload expectations for intervention nurses were not included.	
Avidano Britton, Brinthaup, Stehle, & James, 2006.  U.S.A.	The purpose of the study was to explore the influence of a nurse-managed smoking cessation program, based on the 5 A's approach of the American Cancer Society, and integrated into routine prenatal care.	194 women, with 93 in control group and 101 in experimental group. All self reported smokers before 16 weeks gestation	Not discussed directly, although 5 stages of readiness to changes were included, which correspond to Prochaska and DiClemente's theory of change.	A quasi-experimental design with a control and experimental group in private obstetrical clinics and one acute care medical centre in New York State between 1999 and 2003.	At the postpartum visit more women in the experimental group reported that they were not smoking compared to the control group, however, significant discordance was found between cotinine levels and self-report in both groups. Overall the study found that smoking cessation was negatively associated with the number of smokers in a household, the number of cigarettes smoked	Well developed literature review outlining the key issues of smoking and pregnancy. Demographic details about both groups were well presented. Self-reported smoking was confirmed with urinary cotinine analysis.	Convenience sampling was used rather than randomized sampling. Nurse providers created the intervention program, and no pregnant smokers were involved in the design, implementation, or evaluation of the program.	This program utilized nurses in clinic and hospital settings with no discussion about continuity of care provider. Public health nurses were not used, which might have allowed for the development of an ongoing trusting relationship with women as well as their families, possibly making a difference to the outcomes. As well, since the time frame of the study, the smoking culture has changed in some jurisdictions, with more legislation regarding areas where smoking is prohibited.

Source	Purpose	Sample	Theoretical Framework	Methodology and Intervention	Key Findings	Strengths	Weaknesses	Comments / Critique
					per day, gravity, and parity, while a positive association was found with higher levels of maternal education.			
Bullock, Everett, Dolan Mullen, Geden, Longo, & Madsen, 2009.  U.S.A.	To test the effectiveness of an adaptation of the New Zealand trial of nurse delivered weekly calls aimed at smoking cessation social support during pregnancy and for 6 weeks postpartum.	480 poor rural pregnant smokers, 18 years and older.	Not discussed.	A randomized controlled trial, which examined the effect of telephone support delivered by nurses, along with prenatal smoking cessation booklets. The nursing intervention involved weekly telephone calls to participants, as well as 24-hour participant access to nurses for any additional social support required.	Results suggested a small treatment advantage for all intervention groups for early to mid-pregnancy abstinence, compared to the control groups, however there was also a relatively high abstinence rate among the control group.	Salivary cotinine measurements were collected from all study participants to verify verbal reports of smoking cessation. Power analysis was used to determine sample size, and the goal of 120 per group was achieved. Random selection process was outlined.	This sample of women may have already been motivated to quit smoking by virtue of their choice to participate in the study, and it was noted that in seeking study participants, women who were not interested in quitting reported seeing no reason to participate. Investigators speculated that the process of collecting saliva samples might have inadvertently become more of an active treatment than intended.	Researchers noted that nurses' "interpersonal skills and home visits helped to foster supportive and caring relationships with a group of women", which may have helped to maintain participation of these high-risk women in the trial.  Nurses were a part of the research team and were not necessarily public health nurses. They received extensive training related to telephone support intervention, as well as regular meetings with the research team to discuss problems and provide support to the nurses.
Chalmers et al., 2004.  Canada	To examine the issue of smoking and pregnancy within a broad community context. To consider forces that sustain smoking cessation or cause relapse. To develop, implement, and assess the feasibility of community based smoking	42 women	Ecological lens (Hancock, 2001) Transtheoretical model of behavioral change.	Longitudinal pilot study based on participatory action research, conducted by a team of 42 community members, healthcare practitioners, and research advisors.	Home visits and telephone calls were the most helpful. Personal connection with the intervention nurse was important and valued. Intervention nurse facilitated referrals for additional services. Support groups and telephone support lines were not used, as participants felt that they did not want to discuss	Feedback from participants was valuable in the development of larger projects. The nurses addressed a wide range of health issues outside of smoking cessation.	Although this study was identified as participatory action research, there was little discussion relating to the process of participant involvement in designing the program. Rather it seemed to be more of a pilot project seeking feedback from participants. The 'study team' was not clearly defined, and may or may not have included the women participants. The process of data analysis was not discussed. The background of nurses was not discussed, although it was assumed they were community health nurses by virtue of their	One could assume that as if women were willing to be involved with participatory action research, then they would have been interested and willing to consider quitting, however their findings may well have been applicable to others in their smoking community. Overall effectiveness of this approach was not a part of this study. Participants were 18 years and older.

Source	Purpose	Sample	Theoretical Framework	Methodology and Intervention	Key Findings	Strengths	Weaknesses	Comments / Critique
	cessation and relapse prevention interventions with perinatal women.				concerns with a stranger. The importance of the social environment was influential, with some partners changing their smoking behaviours. Suggestions for improvement included a longer time frame for encouragement and follow-up, along with more supports for partners and family.		connection with a community nurse resource centre.	
Chizimuzo, Greaves, Bottorff, & Marcellus, 2010. Canada	To conduct an integrative review of literature to assess how health care providers engage pregnant smokers in smoking cessation, and to examine those interventions.	Integrative review of 28 research studies.	Not discussed	An integrative literature review using a non-systematic but comprehensive review of a range of relevant databases.	Found that although healthcare providers tended to inquire about smoking and advise pregnant women to quit, they did not as often assist in cessation or arrange further follow-up, and few used all the components of the 5A's.	Search terms and databases were clearly identified, and involved First Nations populations. Article retrieval numbers and selection process was described. Tables summarized studies reviewed in relation to the components of the 5A's.	No rating of the strength of evidence was performed, and there was no critique of the research methods.	Although not specific to nurses or PHNs, this study identified some of the system level barriers including lack of time to engage, lack of training, and lack of written protocols, all of which could be applicable to PHN services.
Ershoff, Quinn, Boyd, Stern, Gregory, & Wirtschafter, 1999. U.S.A.	“To develop and evaluate and evaluate cost-effective intervention strategies for pregnant smokers with diverse	390 pregnant smokers over the age of 18.	Prochaska and DiClemente's stages of change theory.	Prospective randomized clinical trial. The women were randomized into one of three groups involving a booklet, a booklet plus computerized telephone technology,	Although 20% of participants quit smoking, there were no significant differences between intervention groups. In	Measurement tools were clearly identified, although reliability and validity was not discussed.	Details of the telephone interview were not included. Usual care was not discussed.	This study noted that nurses involved in motivational interviewing had no previous training in smoking cessation or motivational interviewing, and that they had competing clinical responsibilities. The nurses involved were described as nurse educators,

Source	Purpose	Sample	Theoretical Framework	Methodology and Intervention	Key Findings	Strengths	Weaknesses	Comments / Critique
	demographic and smoking related characteristics .” (p.162)			or a booklet plus motivational interview sessions with nurse educators. Urine cotinine samples were collected to confirm abstinence.	addition it was found that heavier smokers had lower rates of cessation.			but no further information was offered about their general job duties or educational preparation. It did not appear that these nurses were considered public health nurses.
Gaffney, Baghi, & Sheehan, 2009.  U.S.A.	To synthesize nurse-led research of perinatal tobacco use.	64 published studies	Not discussed	Meta-analysis of nurse-led research on perinatal smoking using both qualitative and quantitative research.	Demonstrated an overall significant trend in the efficacy of nursing intervention looking at prenatal and postpartum smoking cessation outcomes.	Search terms and databases searched were well laid out, as were inclusion criteria.	The nature of nursing roles and involvement with various populations was not included. Although high-risk populations were identified as important, strategies related to this group were not discussed. Community level approaches were also not included.	Although these articles did not specify PHN involvement, they did address nursing and home visiting, showing positive results in reduced cigarette smoking and cessation.
Gebauer, Kwo, Haynes, & Wewers, 1998.  U.S.A.	To examine the effectiveness of a 4A’s nurse-managed individual smoking cessation intervention on short-term abstinence among pregnant smokers in an outpatient ambulatory setting.” P.48	174 women, with 94 in the control group and 84 in the intervention group. All women were 17 years or older.	Not discussed.	This study used a descriptive design with control and intervention groups, and utilized the “Four A’s” of the U.S. Department of Health and Human services. It took place in an outpatient obstetric clinic, and involved a 15-minute one-to-one counseling session on smoking cessation intervention; delivered by an advance-practice nurse, with a follow-up phone call 7-10 days later. Saliva cotinine measures were used to confirm self-reports of abstinence.	Findings indicated that abstinence rates in the intervention group were 15% higher than the control group, and the number of cigarettes smoked was significantly fewer among the intervention group participants than those of the control group. This demonstrated that the 4 A’s approach is effective.	The sample size was considered large enough with a power of 0.90 and an alpha of 0.05. Self-report was verified by saliva cotinine levels.	No discussion of number of cigarettes smoked by each participant. The results focused on the effectiveness of the 4 A’s program without discussing the role of the nurse.	This study used advance practice nurses and had only two contacts with clients, indicating that nurses can be effective in smoking cessation interventions.
Johnson, Ratner, Bottorff, Hall, & Dahinten, 2000.  Canada	To test an intervention to help women avoid or manage smoking relapses in the	251 postpartum women who had attempted to quit smoking during	Marlatt’s relapse model	This randomized clinical trial used nurses providing fact-to-face counseling both in hospital and by phone.	Although the interventions did not prove effective in ensuring long-term abstinence, women in the treatment group	Self report of smoking with biochemical validation. Measurement tools had identified reliability and validity scores.	Information about biochemical analysis of carbon monoxide did not include exposure to household tobacco use. 8 Telephone contacts were used to provide counseling, but on average the calls	Nurses were hired and trained specifically for this study, and were not PHNs with a variety of program commitments. This study was more about the nature of the intervention, and not about the role of nurses in delivering it. (in my

Source	Purpose	Sample	Theoretical Framework	Methodology and Intervention	Key Findings	Strengths	Weaknesses	Comments / Critique
	postpartum period.	pregnancy. 125 in the treatment group and 126 in the control group.			were less likely to resume daily smoking, which the authors feel suggest that nurses can successfully intervene and help women to achieve smoking cessation.		lasted 5.3 minutes, and only 24.8% of participants received all 8 calls. Little information was provided about the nature of the counseling calls and the role the nurses played. It may have been that women with an interest in cessation were more inclined to participate in this study, as there was a 39% refusal rate among all eligible women.	view this kind of nurse intervention did not establish a trusting relationship)
Koniak-Griffin, Anderson, Brecht, Verzemnieks, Lesser, & Kim, 2002.  U.S.A.  Repeated below in immunization section.	To compare an early intervention program of intense PHN home visitation with traditional PHN care for teen mothers over one year postpartum.	102 impoverished or minority primip adolescents aged 14-19 were compared with 42 similar adolescents receiving traditional PHN care for 6 weeks postpartum.	A public health nursing model to help teens gain skills in managing their internal and external worlds.	RCT, early intervention program by PHNs. Data collection involved structured interviews by PHNs, standardized questionnaires, and medical record data. PHNs were specially trained for the EIP group, and used standardized protocols and established clear goals for each visit.	There was an increase in tobacco to one-year post partum. Immunization rates were higher for the intervention group. The program was associated with decreased infant morbidity during the first 6 weeks, however findings demonstrated that both groups benefited from PHN involvement.	Health outcomes were based on medical record data. Sample size and power analyses were adequate. PHNs were assigned to one group or the other to avoid contamination of treatment conditions. Validity and reliability of various measurement tools was discussed.	Data collection for both the intervention and control groups occurred four times throughout this study, and may have had an intervention effect on the control group given the nature of the interview process. Substance use data, including tobacco, was collected by self-report, which has been shown in other studies to be unreliable.	No information was provided about PHN caseload demands, or levels of supervision for either group of PHNs. PHNs provided a range of services, similar to PHNs in BC.
Matone, O'Reilly, Luan, Locallo, & Rubin, 2012	To determine if community smoking patterns affect NFP program outcomes.	6429 women	Not discussed	Retrospective cohort design matching Nurse-Family Partnership clients with matched local area women who smoke. The study sought to assess whether smoking cessation was associated with community smoking patterns.	NFP women had greater smoking cessation compared to comparison women. However, adjusting for the NFP effect, community-smoking rates were significantly associated with prenatal smoking cessation, such		This study relied on self-reports of smoking noted on the birth certificate. Such an approach may be less accurate given that the birth certificate is completed in hospital where staff may not know women well, and where women may not wish to tell health care providers. Intensity of smoking behaviour (#/day) was not included, and has an impact on cessation ability	

Source	Purpose	Sample	Theoretical Framework	Methodology and Intervention	Key Findings	Strengths	Weaknesses	Comments / Critique
					that higher community rates of smoking were associated with lower cessation rates.			
Mejdoubi, van den Heijkant, van Leerdam, Crone, Crijnen, & HiraSing, 2014.  Netherlands  Repeat	To assess the VoorZorg (NFP) programme compared to usual care in reducing smoking. Effects on breastfeeding were also monitored.	460 participants with 223 in the control group and 237 in the intervention group.	Human ecology theory, self-efficacy theory, and attachment theory.	Single blind, parallel-group randomized controlled trial	The program was effective in reducing smoking prenatally and postnatally. Those who continued to smoke smoked fewer cigarettes per day, and less around the baby. A higher percentage of women in the intervention group were still breastfeeding at 6 months.	Although there was a national program for smoking cessation in pregnancy already in place, the intervention group showed better results than the control/usual care group.	This study only included primips. Self-report questionnaires were used to assess smoking levels. Cotinine levels were not measured due to time and financial constraints. There was a high non-response rate among the control group, which may have biased the results.	This article did not describe the normal range of Midwife activities, so the similarities to PHN work could not be directly assessed, however it appears that there are many similarities in the nature of the home visiting component. The Midwife focus was entirely 1:1 based, and did not involve community level activities.
O'Connor et al., 1992.  Canada	To assess the effectiveness of two interventions aimed at smoking cessation for pregnant women, which included either an evening class or individual counseling by public health nurses.	224 entered the study, and 190 were assessed at 6 weeks.	Not discussed.	Randomized controlled trial involving PHNs.	The intervention group had two to three times higher rates of cessation at the three follow-up periods, with the final assessment at six weeks postpartum compared to the control group receiving the usual care.	Urinary cotinine levels were used to confirm self-reports of smoking.	Six weeks postpartum is short compared to other literature that shows a return to smoking habits by one year. The literature review and design did not provide rationale for limiting the study to 6 weeks. Overall, the literature review was quite limited.	This study did utilize a PHN in regular practice, however no discussion was presented about how involvement in this study affected other aspects of their caseload. This study did not address local community rates of smoking, or participation of partner/family smokers.
Olds, Henderson, Tatelbaum, & Chamberlin, 1986;  U.S.A.  Repeat	To evaluate the effectiveness of the NFP program in New York state.	400 women	Human ecology theory; self-efficacy theory; attachment theory (Olds, Kitzman, Cole, & Robinson, 1997).	Randomized clinical trial using 4 different treatment approaches involving PHNs and home visiting, and focusing on young, poor, first time mothers.	75% reduction in the incidence of low birth weight among women who smoked and who were visited by PHNs. Compared to the	Randomization process was clearly outlined and adequate to ensure equal representation in each of the four groups. Serum cotinine levels were used to verify self-report of smoking. A wide range of	Sample was limited to primip teens, and not multiples of lower socioeconomic status. Some teens included were not of low socioeconomic status, and some subjects	Information about PHN training, supervision levels, caseload range and intensity were not discussed, nor were the normal characteristics of nurses providing the usual service. This was grant-funded research and did not

Source	Purpose	Sample	Theoretical Framework	Methodology and Intervention	Key Findings	Strengths	Weaknesses	Comments / Critique
					comparison group, Nurse-visited smokers smoked fewer cigarettes, and serum cotinine measures showed that nurse-visited smokers were more accurate in their reports. Overall there was improved use of community services, health habits, and informal social support.	variables was included in the analysis.	were more than 25 weeks gestation. Power analysis was not discussed. Sociodemographic and health characteristics were equal among the 4 groups, however there were differences with regard to levels of social support.	reflect the influence of a broader range of PHN duty. Data collection involved more than routine client documentation.
Ratner, Johnson, Bottorff, Dahinten, & Hall, 2000.  Canada	To determine the effects of a program designed to prevent smoking relapse during the postnatal period, and to identify factors associated with relapse.	251 women smokers ranging in age from 15 to 40, culturally diverse, and from a range of socioeconomic levels.	Marlatt's relapse model	This follow-up to the original study mentioned above (Johnson et al. 2000), followed the same group of women 12 months postpartum	Found that continuous abstinence and daily smoking rates did not differ between control and treatment groups.	Self-reports of smoking were verified with carbon monoxide assessment. Reliability and validity of assessment tools was discussed.	The intervention involved nurse delivered phone calls, but the assessment phase involved home visits for both groups, and this could have had the effect of an intervention.	As mentioned above, this study involved nurses, but not PHNs.
Tough, S., Johnston, D., Siever, J., Jorgenson, G., Slocombe, L., Lane, C., & Clarke, M. (2006)  Canada  Also: Johnston, D., Tough, S., & Siever, J. (2006). The community perinatal care study: Home visiting and nursing support for pregnant women. <i>Zero to Three</i> , 27(2), 11-17.  Repeat	To examine the impact of additional prenatal care on resource use.	1352 women	The theoretical foundations of the study were not directly discussed, however nurses received training in several theoretical approaches including: -Human perspective on learning -Competency-based approach to pregnancy care -Solution focused counseling	Randomized controlled trial involving standard physician care, standard care plus consultation with a nurse, or the addition of a trained lay home visitor in addition to the first two categories.	Additional supports can improve information needs and use of community-based resources, however no changes in smoking rates were found. No discussion of breastfeeding rates, although use of breastfeeding support was included among	Randomization process was clearly explained. Nurses discussed a range of health topics with participants. Assessment tools were clearly outlined, as was the development of the questionnaire. Comparison was made between women with risk characteristics, and women without risk. Power analysis was discussed.	Recruitment occurred at one of 3 physician run maternity clinics, so there was concern that the standard of practice might change with the introduction of an intervention, which might affect the interpretation of outcomes in this RCT. An assessment study was done prior to the RCT, using a questionnaire about care and information received at the clinic. Results showed an increase in information support by clinic staff for all participants.	Although the nurses involved were PHNs, they were involved only with the research project and did not have the full range of PHN job duties competing for their time. As well, this was a time-limited study, which did not involve the development of broader community supports. Women under 18 were excluded. The intervention period extended just to one week after the birth of the baby, and did not include postnatal care, and consequently rates of

Source	Purpose	Sample	Theoretical Framework	Methodology and Intervention	Key Findings	Strengths	Weaknesses	Comments / Critique
			-Community as partner approach from the Neuman caregiving model		the resources used by participants.		Primip/multip status of participants was unclear. Findings referred to younger women, but those under 18 were excluded from the study.	breastfeeding and smoking were not included in this study.
Wigginton, B., & Lee, C. (2013).  Australia	To examine the experiences of stigma and unintended consequences of smoking for pregnant women.	11 women	Not discussed	Semi-structured interviews and thematic analysis.	Three interrelated themes were identified: "construction of stigma, responses to stigma, and mechanisms for coping" (p.470). Findings included the recognition that stigma and a punitive approach are not helpful in cessation. More effective is encouragement and support with an empathetic approach, acknowledging women's concerns about health, and promoting cessation among family and friends to create a smoke-free environment.	Recruitment continued until saturation was reached. Member checking was offered, although none provided feedback.	One person did the entire interview coding, although sought assistance from one other person as needed. The sample included women aged 20-35, but no teens. The range of socioeconomic differences was limited.	Provided some thoughtful perspective on the nature of broad public health campaigns suggesting individuals are responsible for and should manage their own risk behavior. This study suggests that a more empathetic approach might be more helpful. Something I think is more in keeping with PHN involvement with perinatal smokers.
<b>Immunizations</b>								
Armstrong, Fraser, Dadds, & Morris, 2000.  Australia  Repeat	The aim of this trial was to assess the effectiveness of home-based interventions for vulnerable postnatal families. The	181 families, with 90 randomly assigned to the intervention group, and 91 to the	Not discussed.	This randomized controlled trial involved a structured program of visits from child health nurses with a program focus similar to that of BC PHNs, including establishment of a trusting relationship,	Findings indicated a significant difference in immunization rates with the intervention group having a higher mean number of completed immunizations. A	A number of outcomes were measured in this study, reflecting a broad range of nursing involvement more typical of PHN practice compared to single focus studies. The tools used to measure these outcomes were well described. Qualitative	Part of this study involved a researcher coming into the home of all participants to collect data based on a variety of tools. These visits ranged from 45-110 minutes, and occurred at three times during the course of the research. There was no discussion	Despite some of the shortcomings of the methodology, the findings supported the broad range of PHN activities, and highlighted the importance of the trusting relationship between the nurse and the participants.

Source	Purpose	Sample	Theoretical Framework	Methodology and Intervention	Key Findings	Strengths	Weaknesses	Comments / Critique
	focus was primarily on maternal-infant interaction, although other preventive health measures were also examined including immunizations, smoking, and breastfeeding.	control group.		enhancement of parental confidence and self-esteem, anticipatory guidance, promotion of preventive health care, and facilitation of access to other community services. 3 months duration. Multis and primis involved.	significant difference was found in parental smoking behaviour with fewer of the intervention group smoking inside the house. Breastfeeding rates between the two groups did not show any difference.	commentary from participants indicated that the development of a trusting relationship in a home environment where the client felt both comfortable and in control was the focus of the intervention.	about the possible effects of this involvement, other than to say that the researcher did not provide healthcare. However, it could have influenced the parents in making more visits to the health centre for immunizations. No discussion was provided about the nature of routine clinic visits and the range of information and support that might have been given. It was noted that 35% of the control mothers attended the clinic on a regular basis, and that 20% attended 7 or more times. Although there was self-reporting of changes in smoking behaviour, actual rates of tobacco reduction or cessation were not included in this study. Discussion about routine PHN services, available community resources, and caseload expectations for intervention nurses were not included.	
Barnes-Boyd, 1995. U.S.A.	To examine the effects of 8 months of sustained nursing contact on the health of infants at risk due to social factors.	96 mothers and 97 infants made up the intervention group, with 47 mothers and infants in the control group.	The Interaction Model of Client Health Behavior, which stresses the importance of a relationship between the care provider and the client.	This quasi-experimental study with pretest/posttest, examined the effect of sustained nursing contact with socially high-risk primip and multip mothers on infant morbidity and mortality. The intervention included health screening, health services, and instruction, and focused on interaction and designed to minimize barriers to	Although immunization status was not a primary focus, study findings indicated that both the intervention and control groups showed 80% up to date immunizations for age. Overall findings of this study noted that sustained nursing contact with low-income African-	The inclusion of multiparous women helps to show how interventions make a difference in the broader population of perinatal women at risk.	Randomization was stated as being not possible, however no reason was given for this. This allowed for bias in the recruiting process, which was done by the nurses involved in the study. Selection bias was dismissed as not serious to internal validity, however it was recognized that often mothers who have more serious social problems are less likely to participate in a study, thereby compromising external	There was recognition that the control group actually received a certain amount of intervention by virtue of visits and phone calls for the purpose of data collection. This article did not discuss the availability of any other community services that might have been available at the time, nor was there any discussion about the cost or availability of immunization services. Also not mentioned was anything about nursing caseloads, additional

Source	Purpose	Sample	Theoretical Framework	Methodology and Intervention	Key Findings	Strengths	Weaknesses	Comments / Critique
				service utilization. The nurses were not described as public health nurses, but rather registered nurses with experience in inner city home health nursing with special training in infant care and development. Study duration: 8 months. Both multiples and primips involved.	American mothers, especially teen mothers with more than one infant was beneficial in relation to infant morbidity and mortality.		validity. Social risk factors used to select participants were not completely identified or clearly defined. The qualitative data collection component of this study was not described. This study did not describe the nature of the training received by nurses providing the intervention. While a major premise of this study was the importance of a relationship, the findings focused primarily on the physical differences between groups, and did not link in any findings related to relationship development.	responsibilities, or supervisory support.
Bartu, Sharp, Ludlow, & Doherty, 2006.  Australia	To evaluate the effectiveness of a 6-month postnatal home visiting program on breastfeeding and immunization rates, and on parental drug use.	152 women users of illicit drugs, and randomized into two groups of 76.	Not discussed.	This randomized controlled trial considered the impact of a six-month postnatal home visiting program by midwives on the immunization and breastfeeding rates of drug-using mothers. Secondary outcomes included self-reported use of cigarettes. Study duration: 6 months. Multiples and primips involved.	Findings indicated that the intervention group did not have a longer duration of breastfeeding. There were also no significant differences in immunizations between the two groups. Cigarette use did not differ between groups over the six months of the study.	The study included both primiparous as well as multiparous women, many of whom had other risk factors such as low education, low income, and unemployment.  Cigarette use was included in the range of drugs examined in this study.  The semi-structured intervention allowed for flexibility for the midwife to address other concerns.	A research midwife conducted home visits, and there was no discussion of normal routine postnatal services. No information was provided about the kind of services that might also have been available from PHNs or other community agencies. Infant immunizations and drug use were self-reported. Details were not provided about the approach used by midwives to address issues related to infant immunization, breastfeeding, or tobacco reduction.	This study did not discuss the typical role of a midwife, their caseload expectations, or the level of additional training and support for this study. The nature of the home-visiting intervention as described was similar to the nature of PHN postnatal visits, including assessment of mother, baby, and family; breastfeeding support; referral to community agencies; and immunization information.
Herrmann, Van Cleve, & Levisen, 1998. U.S.A.	To determine if there was improvement in self-esteem, parenting, and social support	Purposeful sample of 56 primiparous teen mothers, however	Erikson's theory of development is briefly mentioned, but does not seem to form a significant basis of	This qualitative study used descriptive statistics to compare changes over time. It did not use a control group.	Infant outcomes in this study included immunization rates, which showed that over 90% of babies	Use of 3 measurement tools and their reliability and validity were discussed. Although immunization status was not the primary focus of this study, inclusion of this	The small sample size limited statistical analysis. Ethnic make up of participants was not equally balanced. This study did not use a control group and thus may not	There was no discussion about the routine practice of PHNs, their caseload, program expectations, or levels of training and supervision affected routine and study interventions.

Source	Purpose	Sample	Theoretical Framework	Methodology and Intervention	Key Findings	Strengths	Weaknesses	Comments / Critique
	for teen mothers when PHNs were involved in case managed.	only 26 completed the study.	this research project.	PHNs, specially trained in the Adolescent Pregnancy and Parenting Program (APP), visited mothers at least monthly, and were always available by phone. There was no PHN prenatal involvement with these women. Study duration: 18 months. Only primips involved.	were up-to-date. Overall findings of this study showed a statistically significant drop in self-esteem for teens between birth and six months post partum, and for social support between six and eighteen months. This study did not show that PHN case management made a difference in self-esteem, however it did show that mothers were more likely to stay in school, follow medical advice, stimulate child development, and immunize their children.	information was supportive of PHN involvement.	have been able to consider the impact of PHN case management in relation to similar mothers without the same support. There was no discussion about the normal level of PHN service for those not in the APP program. There was no discussion about how the immunization rate may have compared to the general population of infants. The age range was limited to 12-17 years, likely to ensure the 18 month follow-up came before they turned 19, but this eliminated 18 and 19 year old mothers.	The nature of the APP program was described and is very similar to the role of PHNs in BC. Level of prenatal care was by self-report.
Kitzman et al., 1997 U.S.A. <u>Repeat</u>	To assess the effect of prenatal and infancy home visits by PHNs on a variety of health outcomes including infant immunization s. The study was also intended to determine if the findings from the Elmira Nurse-Family	1139 women were randomized to one of four treatment conditions ranging from usual care to the full Nurse-Family Partnership program.	Bronfenbrenner's theory of human ecology, Bowlby's theory of human attachment, and Bandura's theory of self-efficacy.	This randomized controlled trial looked at the effect of prenatal and infancy home visitation by PHNs in Memphis, Tennessee, and was undertaken to replicate the Elmira, New York study. Study duration: 2 years. Only primips involved.	Results from this study showed that women in the full NFP program attempted to breastfeed more frequently, although there were no differences in breastfeeding duration. These women were also more likely to use other community services than women in the control groups. However, there were no program	A large sample size was established from statistical power calculations, and the sample was large enough to detect program effects that were limited to half of the total sample. Randomization into the program was done with a computer program, which took into account race, age, gestation, household employment, and geographic region. For those in the home visitation component, randomization to PHN assignment was also done. A wide range of variables were included in the study,	Separate staff members conducted regular interviews with control groups as well as intervention groups, and such interviews may have had an effect on outcomes. No further information was provided about community rates of immunization, or the accessibility and cost of immunization services, making it difficult to determine what is meant by the statement that the program had no effect on immunization rates.	This program was funded by five federal agencies as a research project, and was not a part of routine PHN services. This article did not discuss the nature of NFP PHNs compared to routine PHN caseloads, supervision levels, additional training, or other program demands such as immunization clinics or communicable disease follow-up. As well, this program of study targets only first time mothers. Other studies of immunization rates indicate that the number of children in low-income families has a significant bearing on

Source	Purpose	Sample	Theoretical Framework	Methodology and Intervention	Key Findings	Strengths	Weaknesses	Comments / Critique
	Partnership (NFP) study could be replicated with an African-American population, and when the program was delivered through a public health department.				effects on children's immunization rates by 24 months of age.	and data was collected from mothers directly by researchers, as well as from obstetrical and newborn records, children's medical records, and the Tennessee Department of Human Services.		completion of basic childhood immunization series.
Koniak-Griffin, Anderson, Brecht, Verzemnieks, Lesser, & Kim, 2002  U.S.A.  Repeat	To compare the effects of PHN early and intense visitation of impoverished teen mothers on infant health with traditional PHN care.	144 Latina and African-American adolescent mothers	A public health nursing model to help teens gain skills in managing their internal and external worlds.	RCT, early intervention program by PHNs for 102 postpartum adolescents was compared with 42 adolescents who dropped out of the study and received traditional PHN care involving 1 or 2 prenatal visits, and 1 postnatal visit. Data collection involved structured interviews by PHNs, standardized questionnaires, and medical record data. Study duration: 1 year. Multips and primips involved.	Statistically significant difference in immunization rates with intervention group having 96% completion and 86% in the traditional care group. 37% of the smokers were still smoking at 1 year postpartum, with 4 teens beginning to smoke after childbirth. Findings of this study demonstrated improved health outcomes of children of teen and other high-risk moms.	Target sample size was established based on power analysis. Intervention PHNs only provided care to teens in one group to avoid treatment contamination. Traditional PHN care was clearly outlined. Reliability and validity of tools used to measure outcomes were discussed. Immunization data was verified with the community health department.	Data collection for both the intervention and control groups occurred four times throughout this study, and may have had an intervention effect on the control group given the nature of the interview process. Substance use data, including tobacco, was collected by self-report, which has been shown in other studies to be unreliable.	Substance use definitions did not isolate tobacco use in this study. PHNs were specially trained for the EIP group, and used standardized protocols and established clear goals for each visit. No information was provided about PHN caseload demands, or levels of supervision for either group of PHNs.
Quinlivan, Box, & Evans, 2003  Australia  Repeat	To assess the effect of postnatal home visiting to teen mothers by certified nurse-midwives in reducing	136 adolescents with 65 in the intervention group, and 71 in the control group.	Not discussed	Randomized controlled trial involving nurse-midwives. Data was collected through participant questionnaires, and immunization and breastfeeding information was	Study results showed no significant difference between groups in relation to immunizations or breastfeeding rates at 6 months postpartum The	Sample size was based on power analysis showing the need for at least 60 participants in each group. Use of Anova to control for effects of factors that might affect knowledge outcomes, for example: age, social class.	The study population was limited to first time teen mothers, not multips. There was no discussion of what was involved with routine postnatal follow-up for both groups. The intervention was limited to 5 structured home visits.	The nature of the intervention home visit protocol was very similar to the kinds of things routinely done by PHNs in BC, including teaching about infant feeding, immunizations, and contraception, as well as providing advice, support, and information regarding a range

Source	Purpose	Sample	Theoretical Framework	Methodology and Intervention	Key Findings	Strengths	Weaknesses	Comments / Critique
	adverse neonatal outcomes, and improving maternal knowledge about immunizations schedules, breastfeeding, and contraception.			verified against medical records, and analyzed through statistical analysis. Study duration: 6 months. Only primips involved.	authors of this study suggest that home visiting is not effective in improving breastfeeding knowledge or duration	Social class scores were based on a combination of participant's education level, their parent's education level, and family income. Randomization to the two groups was done with a computer program. Immunization data was verified against the National Immunization Register. Breastfeeding data was verified against medical records.	At the time of the study there was a media campaign to improve immunization rates in general, sponsored by the Australian federal government. This involved a financial incentive for both parents and family doctors. The effect of this additional attention on immunizations may have affected the lack of findings between the two groups.	of health issues, and also referrals to other community services including community health nurses. This study did not provide any information about community rates of immunization, nor about the cost or availability of vaccines. Community breastfeeding levels were also not discussed, which may have influenced the lack of significant differences between the groups.
Schaffer, Goodhue, Stennes, & Lanigan, 2012, U.S.A.	To describe the 'Pregnant and Parenting Teen Program' development, key features, and evaluation of program effectiveness. The goal of the program is to promote child and family health and self-sufficiency.	758 teen mothers primip or multip, data collected over 2.5 years.	Resiliency theory	Outcome assessment evaluation for a PHN visiting program for pregnant and parenting teens, addressing changes in participants but not suggesting causation, and compared to general population of pregnant teens. Program effectiveness was based on achievement of specific program goals, including completion of immunizations. Study duration: 2.5 years. Multips and primips involved.	95% of children of participants were up-to-date on immunizations.  Participants were more likely to be enrolled in school, and had better birth outcomes including birth weight and gestation. Findings from the evaluation confirmed the importance of the development of a trusting relationship between PHNs and teens	Specific standards have been developed for PHN visits. The program incorporates many of the wider community level activities and connections to support teen moms, as do PHNs in BC. Data was obtained from birth certificates for both program participants and the general population of teen mothers. Program inclusion criteria included living in the specified geographic area, birth at age 19 years or younger, and identified at any point in pregnancy or up to 2 months postpartum. Immunization data from electronic client records.	The workload of PHNs not described in relation to other PHN duties. This program also involves paraprofessionals along with PHNs. Tool used to assess environmental supportiveness and safety (HOME scale), assessment of child development (ASQ), and the trusting relationship questionnaire were not discussed in terms of reliability and validity. No mention of nurse-sensitive outcome measures. Statistical analysis of findings was not included due to financial limitations.	This program was part of a not for profit nurse home visiting agency. The overall findings were compiled by an external research organization.

## Appendix B

### Ethics Approval

## Certificate of Ethical Approval for Harmonized Minimal Risk Health Study

Also reviewed and approved by:

University of Victoria

Board of Record Approval Reference #:

**Mary Hill University of Victoria** Study Title: **Public health nursing: What difference does it make for priority perinatal women?**

*Board of Record*

**Island Health**

Health Research Ethics Board (HREB) 1952 Bay Street 3rd Floor – Kenning Wing,  
Memorial Pavilion Royal Jubilee Hospital Victoria, BC V8R 1J8



---

Principal Investigator: Primary Appointment:

Study Approved: **Oct-21-2015**

Research Team Members: Kathy Easton Elizabeth Borycki

Expiry Date: **Oct-20-2016**

Sponsoring Agencies: N/A

Documents Included in this Approval:

HREB application content Study Protocol Informed Consent Form Transcriptionist  
Agreement Study Budget

Interview Questions Recruitment Poster Recruitment Invitation Data Fields

Staff Meeting Script

Version 21-Oct-2015 V2, 16-Oct-2015

V4, 21-Oct-2015 V4, 21-Oct-2015 V1, 7-Jul-2015 V1, 8-Jul-2015 V2, 16-Oct-2015 V2,  
16-Oct-2015 V2, 16-Oct-2015 V1, 13-Oct-2015

Marjorie MacDonald Lenora Marcellus

## **J2015-090**

This ethics approval applies to research ethics issues only and does not include provision for any administrative approvals required from individual institutions before research activities can commence.

The Board of Record (as noted above) has reviewed and approved this study in accordance with the requirements of the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans ([TCPS2, 2014](#)).

The “Board of Record” is the Research Ethics Board designated on behalf of the participating REBs involved in a harmonized study to facilitate the ethics review and approval process. In the event that there are any changes or amendments to this approved protocol, please notify the Board of Record.

---

Page 1 of 2

---

**Board of Record Research Ethics Board Representative Name:** Lynn Cummings,  
BNSc, MN **Title:** Chair, Island Health HREB **Signature:** **Date:** 2015.10.21

**Date:** Oct-21-2015

## Appendix C

### Recruitment Poster

# Public health nursing: What difference does it make for at-risk perinatal women?

- ◆ Are you a PHN or PHN leader who supported or provided perinatal services between January 2009 and December 2012?
- ◆ Did you work for Island Health in \_\_\_\_\_, \_\_\_\_\_, or \_\_\_\_\_ areas during that time?
- ◆ Are you interested in talking about your experiences in providing support to at-risk or vulnerable perinatal women?
- ◆ Are you willing to be involved in a doctoral research project through the University of Victoria's School of Nursing?

If you would like to find out more about this opportunity, please contact Mary Hill at:

[mehill@uvic.ca](mailto:mehill@uvic.ca), or phone \_\_\_\_\_



## Appendix D

### PHN Participant Recruitment Invitation

My name is Mary Hill, and I am a doctoral student in Nursing at the University of Victoria, working with Dr. Marjorie MacDonald as my supervisor. After many years of working as a public health nurse and a manager of community health services, I am enjoying the opportunity to learn more about the role PHNs play in helping priority perinatal women to achieve higher rates of breastfeeding, infant immunizations, and maternal tobacco reduction.

Public health nurses have provided support for young, low-income and poorly educated perinatal women for many years, yet we know very little about how effective PHNs are in their day-to-day work in achieving these key health outcomes. By examining the data from electronic health records, and by talking with PHNs and PHN leaders who have been involved in delivering service, I hope to learn more about the differences PHNs make with priority perinatal women, and what organizational factors influence the delivery of those services.

You are invited to participate in this study if you worked as a PHN or PHN leader in \_\_\_\_\_, \_\_\_\_\_, or \_\_\_\_\_ in the period of time from 2009 to 2012, and supported or provided care to women in the perinatal period. If you are interested in contributing to this study, and willing to take an hour of your time to participate in a confidential, semi-structured interview, I would like to hear from you.

I am interested in learning more about:

- how long you have worked as a PHN, and what kind of work you have done with women in the perinatal and postpartum area.
- the nature of PHN services provided to priority perinatal women in your area.
- how you initially learned about working with priority perinatal women.
- what guided your practice with this priority population.
- what documents guided your practice.
- what organizational factors influenced your work in this area.
- how you would approach the issues of breastfeeding, immunizations, and tobacco with priority perinatal women.
- how you would go about problem solving in relation to the delivery of this service.
- the network of communications within your organization in relation to planning for and delivering services for priority perinatal women.
- what broader community level approaches PHNs were involved with that you think make a difference to these three outcomes.
- what systems level activities, such as protocol or policy development, that PHNs were involved with in relation to breastfeeding, tobacco reduction, or immunizations that you think may have influenced the priority perinatal population.
- anything else you would like to add about the nature of PHN services for priority perinatal women that might have influenced these three outcomes.

This confidential and voluntary interview would be done outside of work time at a time and place convenient for you, and a detailed consent form will be reviewed at that time. A small token of appreciation will be provided at the end of the interview.

All personal information will be kept confidential, and no individuals or sites will be identified by name.

If you are interested in contributing to this research project, please contact me at [mehill@uvic.ca](mailto:mehill@uvic.ca), or by phone or text at \_\_\_\_\_.

Thank you for your interest in this subject!

Mary E. Hill PhD(c), MEd, BScN, RN.  
Graduate Student, School of Nursing,  
University of Victoria  
email: [mehill@uvic.ca](mailto:mehill@uvic.ca)  
cell: \_\_\_\_\_

## Appendix E

### Informed Consent for PHN Participants

#### Public health nursing: What difference does it make for priority perinatal women?

##### Participant Consent for individual interview

You are being invited to participate in a study entitled “Public Health Nursing: What difference does it make for priority perinatal women” being conducted by Mary E. Hill, PhD(c), MEd, BScN, RN. Your participation must be free and voluntary. You are free to withdraw at any time.

Mary Hill is a Graduate student in the School of Nursing at the University of Victoria. You may contact her if you have further questions by email at [mehill@uvic.ca](mailto:mehill@uvic.ca), or by telephone at \_\_\_\_\_. As a graduate student, she must conduct research as part of the requirements for a doctoral degree in Nursing. It is being conducted under the supervision of Dr. Marjorie MacDonald. You may contact her at \_\_\_\_\_.

##### Who is funding this research?

This research project has been indirectly supported through fellowships and scholarships by the Canadian Institute of Health Research (CIHR) Applied Public Health Chair, the BC Health Officers Council, the Public Health Association of B.C., the University of Victoria, Vancouver Island Health Authority scholarships, and the Registered Nurses Foundation of BC. This research is not financially supported by any commercial organizations.

##### What is this study all about?

The purpose of this study is to explore how public health nursing (PHN) practice affects health outcomes related to breastfeeding duration, infant immunizations, and maternal tobacco use within the population of families who receive additional supports from PHNs throughout the perinatal period and into the first two years of a child’s life. The population that is often prioritized to receive enhanced PHN involvement is that of pregnant and postpartum women who may have a number of social risk factors.

Part of this project is intended to explore PHN and PHN leaders’ perspectives about how the healthcare organization, of which they are a part, influences their practice and ultimately the achievement of these outcomes. This study is designed to explore the real-life practice of PHNs, as it exists day-to-day amidst the influences of ever changing politics, program demands, and environmental concerns through the use of a mixed method a case study design.

##### Why is this research important?

Research of this type is important because women in this priority population are more likely than others to experience less than ideal health outcomes (Dyson, Green, Renfrew, McMillan, & Woolridge, 2010; Erickson & Arbour, 2012; Kim, Frimpong, Rivers, & Kronenfeld, 2007; Strathearn, Mamun, Najman, & O’Callaghan, 2009). In its guiding

framework for public health, the BC Ministry of Health (2013), outlined expectations for the public health system, recognizing that some women experience conditions that put their health at risk, and highlighted the importance of prenatal and postnatal support for these vulnerable families. Exploring the perspectives of PHNs and their leaders about how their health care organization influences the support that PHNs offer to these families will provide valuable feedback for those involved in program planning, and may ultimately help to improve population health outcomes.

### **Why should you participate in this study?**

You are being asked to participate in this study because of your experience as a PHN in delivering services to vulnerable perinatal women, or as a leader involved in PHN programs in at least one of the three communities being examined within the Vancouver Island Health Authority.

### **What will you ask me about?**

If you agree to voluntarily participate in this research, your involvement will include a one-hour confidential semi-structured interview with the researcher at a time and location convenient to you, outside of your workplace. The interview will be an opportunity to talk about the kinds of organizational influences that you feel affect PHN involvement with priority perinatal women, with a focus on activities around breastfeeding, maternal tobacco use, and infant immunizations. In this semi-structured interview, I will ask a number of questions about your experience as a PHN working with this population, the nature of the support and direction received from your organization, and the kinds of individual, community, and systems level activities PHNs engaged in to support priority perinatal women. You do not have to answer every question if you choose not to. The interview will be recorded on a digital recording device, and later transcribed by the principal investigator. The transcription may also be done by a hired transcriptionist who will have agreed to maintain full confidentiality by signing a confidentiality agreement. All identifying information will be removed.

The personal information I will collect includes your name and e-mail address, your educational background, and the length of time you have worked in this role. The first two will be used to arrange an interview time, and to send you a copy of your transcribed interview, as well as the final summary report of this research project. Your educational background and your experience in this role will help to provide context for your interview responses.

### **What are the risks and benefits of participating?**

Participation in this study may cause some inconvenience to you, such as the time required for the interview. It may also possibly cause fatigue, stress, or emotional or psychological stress depending on what you choose to share with the interviewer. Your employer will not know if you have participated. Your comments will be combined with those of other participants, and common themes identified, so your individual comments will not be recognized in the results of this study. By consenting to participate in this study you have not waived any rights to legal recourse in the event of research-related harm.

The potential benefits of your participation in this research include the opportunity to make a contribution to the knowledge base related to the effectiveness of PHNs in their work with priority perinatal women in achieving key health outcomes for their family.

### **Will I be paid for participating in this study?**

As a way to compensate you for any inconvenience related to your participation, you will be given a \$10.00 gift card from Thrifty Foods at the time of your interview. It is important for you to know that it is unethical to provide undue compensation or inducements to research participants and, if you agree to be a participant in this study, this form of compensation to you must not be coercive. If you would not otherwise choose to participate if the compensation was not offered, then you should decline.

### **Do I have to participate in this study?**

Your participation in this research must be completely voluntary. You are under no obligation to participate. If you decide to participate, you may withdraw at any time without any consequences or any explanation. You will be reminded of this throughout the course of your involvement with this project. If you withdraw from the study your data will be used only if you give permission, otherwise it will be deleted before transcription. However, once the transcription of your interview has been deidentified and combined with other data, it will be impossible to retrieve your specific contribution. The gift card will be yours to keep regardless of your choice to have your interview included in the study.

### **How will my confidentiality be protected?**

Your confidentiality will be protected within the limits of the law. Your personal information and your interview responses will be protected by de-identifying personal information, and by not including any identifiable information in the transcribed material. Paper copies of signed consent forms will be scanned and maintained in an electronic file. The paper copies will then be shredded. As the primary investigator, I will keep all data collected for this study for a period of five years in a secure, password protected electronic file, on a firewall protected server at the University of Victoria. Data from this study will be disposed of by erasing any electronic data five years after completion of the study.

Aside from the possible use of a transcriptionist, the only people who may have direct access to the deidentified data collected will be Dr. Marjorie MacDonald, Graduate Supervisor, or PhD Committee members Dr. Elizabeth Borycki, and Dr. Lenora Marcellus. The purpose of this will be to provide guidance and direction regarding the handling and analysis of this qualitative data. The three sites included in this study will not be identified by name, but will be assigned a code such as site A, B, or C.

The deidentified data from this research project may possibly be used for secondary analysis in the future related to this project. If that occurs, the confidentiality of all participants will be maintained. At this time there are no plans to conduct further research.

### **How will the results of this research be shared?**

It is anticipated that the results of this study will be shared with others in the following ways:

- in a final published dissertation
- through a summary report of the research finding for participants and the Island Health Authority



## Appendix F

### PHN Interview Questions

For my interviews with PHNs, the following questions provided structure and direction in exploring the work that PHNs do with priority perinatal women.

#### *Demographic information.*

- When did you receive your nursing degree?
- What is your highest level of education?
- How long have you worked as a PHN, and how long in your current role?

#### *Background information.*

- What kind of work have you done with women in the perinatal and postpartum area?
- What is the general nature of PHN services you provided to priority perinatal women in your area?
- How did you initially learned about working with priority perinatal women?

#### *Focus areas.*

- What or who guided your practice with this priority population?
- How did you know who to visit?
- What documents or other things guided your practice?
- What difference do you think PHNs make with the priority perinatal population in relation to breastfeeding, immunizations, and tobacco outcomes?
  - At an individual level, a community level, a systems level.

- What broader community level approaches were PHNs involved with that you think make a difference to these three outcomes? In what way did they make a difference?
- What systems level activities, such as protocol or policy development, were you involved with in relation to breastfeeding, tobacco reduction, or immunizations that you think may have influenced the priority perinatal population?
- How did organizational factors influence your work in this area?
- Do you think PHNs made a difference in these three outcomes with the priority perinatal population, and if so can you describe what you did that made a difference?
- How would you know this made a difference?
- How would you approach the issues of breastfeeding, immunizations, and tobacco with priority perinatal women? Can you walk me through a scenario?
- How would you go about problem solving in relation to the delivery of this service? Who or what would you consult?
- Tell me about the network of communications within your organization in relation to planning for and delivering services for priority perinatal women.
- What external organizations or documents supported the planning for and delivery of perinatal services?
- Is there anything else you would like to add about the nature of PHN services for priority perinatal women that might have influenced these three outcomes?

## Appendix G

### Check list for compiling Excel files with BCCDC data

		L H A	L H A	L H A
1	Work with one LHA at a time. Start by opening <b>Child General file</b> as this has both mom and child IDs. Rename file to protect the original data. Use file name format “LHA##(masterfile)date”.			
	Delete unnecessary columns keeping only: child ID; mom ID; Child DOB; appointment type; encounter date.			
	Add new columns and rename as outlined in “LHA71masterDec6,16” to include all future columns. (cut and paste from original file) (make sure there are no spaces, numbers, or slashes in column titles)			
	Freeze headings row.			
	Format each column according to its nature (number, general, date special ‘mm/yyyy’)			
	Clean child general file by: ‘find and replace’ blank cells under encounter type and replace with ‘X’ ‘find and replace’ blank cells under encounter date and replace with ‘00/0000’			
	SAVE changes			
	Highlight in yellow the last set of entries across all columns in this file to mark the end of one file and the beginning of the next.			
2	Open <b>NWBA file</b> Rename file to protect the original data. Use file name format “LHA##(file)date”.			
	Delete unnecessary columns, keeping only: child ID; appointment type; encounter date; breastfeeding at discharge; feeding breastmilk; feeding mixed milk; local study; local study description.			
	Clean NWBA file: by searching for entries that indicate that yes there was breastfeeding, but that were recorded as NAP, OBS, REF, UNR, or T* (for no apparent problem, observe, refer, unresolved, and treatment). Replace all such entries with “1” for yes. Find ‘N’ and replace with ‘0’ Leave blank cells blank.			
	Search ‘local study’ column for any ‘Y’s and check corresponding description column next to it to make sure there is some indication of household smoking, if so add a comment to that effect. Scan all text in description column and delete comments related to non-smoking. In the local study description column convert all text entries to ‘1’ for yes, and all blanks to ‘0’.			
	‘find’ blank cells under encounter type and replace with ‘X’ ‘find’ blank cells under encounter date and replace with ‘00/0000’ “Find” dates out of study range (2007, 2008, 2013, 2014, 2015, 2016). If any, then convert whole range to table format to sort on encounter dates, being careful not to			

	include headings row. Review each month to look for years outside of the study period, and delete each block of cells related to these dates.			
	Convert table back to range data, being careful not to involve headings row.			
	SAVE changes in this file.			
	Copy and paste each final column into the master file for that LHA. Do not copy 'local study' column, just the corrected local study description. Be careful to insert each column into the correct place directly under the yellow highlighted row. Do not include any heading rows.			
	Highlight in yellow the last row of entries in the master file.			
	SAVE changes in master file			
3	Open <b>IMMs</b> file for that LHA. Rename file to protect the original data. Use file name format "LHA##(file)date".			
	Maintain columns for child ID; imms agent; imms date.			
	Use "Find" to look for any out of study range dates, and if so, convert range to table (avoiding headings row).			
	Sort on imms date - it will sort by month and then year. Scroll down through each month to look for dates out of study range. Check by using FIND */2013, 2014, 2015, 2016. Also 2008, 2007 to be sure. Delete each block of cells related to these dates.			
	Convert table back to range (watch out for headings) (Data – table tools – convert to range).			
	SAVE changes			
	Copy and paste each final column into the master file for that LHA. Be careful to insert each column into the correct place directly under the yellow highlighted row. Do not include any heading rows.			
	Highlight in yellow the last row of entries in the master file.			
	SAVE changes in master file			
4	Open <b>ECHA</b> file for that LHA. Rename file to protect the original data. Use file name format "LHA##(file)date".			
	Delete unnecessary columns. Maintain columns for: client (child) ID; appointment type; encounter date; breastfeeding; mixed feed; local study; and local study description.			
	Clean by searching for entries that indicate that yes there was breastfeeding, but that were recorded as NAP, OBS, REF, UNR or T* (for no apparent problem, observe, refer, unresolved, and treatment). Replace all such entries with "1" for yes, "0" for no or blank cells. Do this for all breastfeeding columns.			
	'find' blank cells under encounter type and replace with 'X' 'find' blank cells under encounter date and replace with '00/0000' If both entries are blank and if there is no other corresponding information in this file to include in relation to the 3 outcomes of interest, convert to table and delete entire row.			
	Search for out of study range dates and, if any, convert whole range to table format to sort on encounter dates, being careful not to include headings row. Review each month to look for years outside of the study period. 2007, 2008, 2013, 2014, 2015, 2016. Delete each block of cells related to these dates.			

	Search ‘local study’ column for any ‘Y’s and check corresponding description column next to it to make sure there is some indication of household smoking, if so add a comment to that effect. Scan all text in description column and delete comments related to non-smoking. In the local study description column convert all text entries to ‘1’ for yes, and all blanks to ‘0’ for ‘not recorded’			
	Convert table back to range (watch out for headings) (Data – table tools – convert to range).			
	SAVE changes			
	Copy and paste each final column into the master file for that LHA. Be careful to insert each column into the correct place directly under the yellow highlighted row. Do not include any heading rows.			
	Highlight in yellow the last row of entries in the master file.			
	SAVE changes in master file			
<b>5</b>	<b>Open Mom General file.</b> Rename file to protect the original data. Use file name format “LHA##(file)date”.			
	Delete unnecessary columns. Maintain columns for: mom ID; child ID, appointment type; encounter date.			
	‘find’ blank cells under encounter type and replace with ‘not recorded’ ‘find’ blank cells under encounter date and replace with ‘00/0000’ If both entries are blank and if there is no other corresponding information in this file to include in relation to the 3 outcomes of interest, convert to table and delete entire row.			
	Search for out of study range dates, and if any, convert whole range to table format to sort on encounter dates, being careful not to include headings row. Review each month to look for years outside of the study period. 2007, 2008, 2013, 2014, 2015, 2016. Delete each block of cells related to these dates.			
	Convert table back to range (watch out for headings) (Data – table tools – convert to range).			
	SAVE changes			
	Copy and paste each final column into the master file for that LHA. Be careful to insert each column into the correct place directly under the yellow highlighted row. Do not include any heading rows.			
	Highlight in yellow the last row of entries in the master file.			
	SAVE changes in master file			
<b>6</b>	<b>Mom postpartum file.</b> Rename file to protect the original data. Use file name format “LHA##(file)date”.			
	Delete all columns except mom ID, appointment type, encounter date, breastfeeding, local study, and local study description			
	Add a column entitled ‘count of pp mom encounters’. In first cell insert the formula: =COUNTIF(A:A, A3) and run formula down the column by clicking and dragging on small box bottom right corner.			
	<b>To determine encounter frequency for each mom:</b> Convert whole data set to a table format. Then sort on this new column plus sort on mom ID. This will order the number of contacts from top to bottom.			

	Then, in a new sheet, copy the results of the new column as cut and paste special (or reformat from formula to numbers) into A1. Next make a new column heading called 'Bins' and added the numbers 1-20. Then run data analysis as per notes on BCCDC data management notes of Jan.2/17.			
	'find' blank cells under encounter type and replace with 'not recorded' or 'X' 'find' blank cells under encounter date and replace with '00/0000' If both entries are blank and if there is no other corresponding information in this file to include in relation to the 3 outcomes of interest, convert to table and delete entire row.			
	Search 'local study' column for any 'Y's and check corresponding description column next to it to make sure there is some indication of household smoking, if so add a comment to that effect. Scan all text in description column and delete comments related to non-smoking. In the local study description column convert all text entries to '1' for yes, and all blanks to '0' for 'not recorded'			
	Clean breastfeeding column by searching for entries that indicate that yes there was breastfeeding, but that were recorded as NAP, OBS, REF, UNR, T* (for no apparent problem, observe, refer, unresolved, and treatment). Replace all such entries with "1" for yes, "0" for No. Leave blank cells to indicate nothing was recorded.			
	Search for out of study range dates, and if any, convert whole range to table format to sort on encounter dates, being careful not to include headings row. Review each month to look for years outside of the study period. 2007, 2008, 2013, 2014, 2015, 2016. Delete each block of cells related to these dates.			
	Convert table back to range (watch out for headings) (Data – table tools – convert to range).			
	SAVE changes			
	Copy and paste each final column into the master file for that LHA. Be careful to insert each column into the correct place directly under the yellow highlighted row. Do not include any heading rows.			
	Highlight in yellow the last row of entries in the master file.			
	SAVE changes in master file			
7	<b>Mom EDCO file.</b> Rename file to protect the original data. Use file name format "LHA##(file)date".			
	Delete all columns except for: (mom)client ID, appointment type, encounter date.			
	'find' blank cells under encounter type and replace with 'not recorded' or 'X' 'find' blank cells under encounter date and replace with '00/0000' If both entries are blank and if there is no other corresponding information in this file to include in relation to the 3 outcomes of interest, convert to table and delete entire row.			
	Search for out of study range dates, and if any, convert whole range to table format to sort on encounter dates, being careful not to include headings row. Review each month to look for years outside of the study period. 2007, 2008, 2013, 2014, 2015, 2016. Delete each block of cells related to these dates.			
	Convert table back to range (watch out for headings) (Data – table tools – convert to range).			
	SAVE changes			

	Copy and paste each final column into the master file for that LHA. Be careful to insert each column into the correct place directly under the yellow highlighted row. Do not include any heading rows.			
	Highlight in yellow the last row of entries in the master file.			
	SAVE changes in master file			
<b>8</b>	<b>Separating the priority mothers and children from the non-priority based on 5 or more postnatal contacts.</b>			
	Convert LHA Masterfile to Table format			
	Sort on child ID, then mom ID (should see orphan moms extra at bottom) This should group all children (and siblings) with their mother. Make sure there are no blanks for mom ID by using VLOOKup (pull down child ID numbers manually if need be)			
	Sort on #mom encounters to group those families with more than 5 postpartum encounters. Cut and paste those priority families into a new sheet in the same workbook.			
<b>9</b>	<b>Counts for each outcome of interest</b>			
	<ul style="list-style-type: none"> <li>• New sheet</li> <li>• Cut and paste (paste special for formula columns) Mom ID column (previously sorted by MOM ID so they are all together), and the various columns to count (pp bfg, nwba bfd at dc, nwba bfg, nwba mixed) or tobacco – pp tob, nwba tob.</li> <li>• Add new column for combined bfg (or tobacco) total</li> <li>• Insert formula at top of new column: =IF(B3=1, 1, IF(C3=1, 1, IF(D3=1, 1, IF(E3=1, 1, 0)))) to total all instances of bfg across the 4 columns.</li> <li>• That gives you a 1 for each encounter of that mom ID where bfg was documented, and lots of 0's for when there is no documentation of bfg at that encounter.</li> <li>• Run that formula down the column.</li> <li>• To count the individual Mom IDs and any instance of bfg at birth, go to a new sheet</li> <li>• Cut and paste Mom ID for column A, and the new combined bfg column (paste special) into B</li> <li>• Make into a table.</li> <li>• Highlight table and SORT on column B (combined bfg or tob) only, with largest to smallest. <ul style="list-style-type: none"> <li>○ Once all 1s are together, copy &amp; paste just that group with 1s into a new column, then start the remove duplicates process to get # unique identifiers.</li> </ul> </li> </ul>			
	<p>To get the count of immunizations:</p> <ol style="list-style-type: none"> <li>1. New sheet</li> <li>2. Copy and paste special Child ID and Imms agent columns from Masterfile</li> <li>3. Find all text by using * and replace with 1</li> <li>4. Create pivot table by highlighting both columns, Insert tab, select pivot table, then drag child ID to rows box, and imms agent to values box, once done can sort using the row label triangle – decending. Then just scroll down to the</li> </ol>			

cutoff point of 11 imms per child ID. Because each child ID is unique I can see how many have 11 or more.

To get the counts for bfg and Tob at 12 and 18+ months:  
 Use a new workbook, because the first one seemed to get too cumbersome.  
 Copy over columns: Mom ID, Child DOB, child encounter dates, echa bfg, echa mixed feed, and echa tob.  
 Add new columns for Date difference, bfg@ 12+mo, bfg@18+mo, and Tob@18+mo.  
 In the following order:

											bf	
				ec		bf	bf	T			g	
MO	child			ha	ec	g	g	ob			@	
M_	ENC			mi	h	@	@	@			1	
CLI	OUN	Date	ec	xe	a	12	18	18			2	MOM
EN	Chil	TER	diffe	ha	df	T	+	+	+		+	_CLIE
T_I	dD	_DA	renc	Bf	ee	O	m	m	m		m	_NT_I
D	OB	_TE	e	g	d	B	o	o	o		o	D

Placing the 12 & 18mo bfg columns and 18mo Tobacco columns at the end. This is important because future formulas will depend on this order.

1. Use VLookup to fill in all child DOB cells (see details below)
2. Calculate date difference column
3. Calculate bfg at 12 and 18 mo,
4. Calculate tob at 18 mo

Use VLOOKUP to fill in childDOB for every line. Do this by:

New sheet, copy and paste all columns,

Add new columns for: Date difference, BFG@ 12+ and 18+ mo., Tob@ 18+mo  
 make into a TABLE, sort on child DOB, and Mom ID to get orphan cells at bottom.

Then populate all DOB by doing VLOOKUP

In first empty cell put in =VLOOKUP(Acell#, A:B, 2, FALSE), and run down the column. Check a few first to confirm.

Then sort back to get MomIDs all grouped together – Sort on MomID then on encounter dates. Sorting on encounter dates puts them all in order so should be easier to find the 18+. Include a sort on bfg columns and tobacco to get them all aligned near the top of each momID.

Next do the calculation for DOB plus >=18 months (for each formula make sure the row number is what is needed for the starting cell – depending on the presence or absence of headings)

This formula for date calculation is based on the mm/yyyy format that my data was provided in.

The formula for DateDifference is:

=(LEFT(C3, 2)-LEFT(B3,2))+((RIGHT(C3, 4)-RIGHT(B3,4)) \* 12)

if no column headings, then use: =(LEFT(C2, 2)-LEFT(B2,2))+((RIGHT(C2, 4)-RIGHT(B2,4)) \* 12)

The formula in BFG@ 18+ is:  
=IF(D3>=18,IF(E3=1,1,IF(F3=1,1,0)), 0)

For bfg @ 12+ months: =IF(D3>=12,IF(E3=1,1,IF(F3=1,1,0)), 0)

Similarly so for Tobacco at 18 month – just change the column references.  
=IF(D3>=18,IF(G3=1,1, 0), 0) check starting cells

Once the formula is run on just these columns, then from there cut and paste the child ID and the new result column into a new sheet (or further over on the same sheet), SORT, and eliminate duplicates to get the count.

## Appendix H

### Results of Statistical Tests

#### I Categorical data from Excel files:

	Area 1	Area 2	Area 3	Total
Total number children	992	508	1285	2785
Total Priority children	119	86	150	355
Total Non-priority children	873	422	1135	2430
Sets of priority twins	2	1	1	4
Sets of priority siblings	0	3	4	7
Total number of Moms	951	490	1244	2685
Total Priority Moms	116	81	144	341
Total Non-priority Moms	835	409	1100	2344
Priority BFG at birth	115	74	136	325
Priority BFG at 6+ months	67	41	54	162
Priority BFG at 12+ months	37	21	22	80
Priority BFG at 18+ months	16	12	4	32
Non-priority BFG at birth	434	148(167)	590	1191
Non-priority BFG at 6 + months	412	167	282	861
Non-priority BFG at 12+ months	133	97	121	351
Non-priority BFG at 18+ months	56	46	34	136
Priority tobacco at birth	57	55	12	124
Priority tobacco at 18+ months	53	49	4	106
Non-priority tobacco	132	59	85	276
Non-priority tobacco at 18+ months	165	194	37	396
Priority Imms =>11 vaccines at 18+ months	103	58	126	287
Non-priority=>11 at 18+ months	615	305	950	1870
Total priority line entries	5108	3865	5965	14938
Total Non-priority line entries	19618	9946	30404	59968
Total line entries				74,906

## II Combined totals for all three areas

### Breastfeeding at birth – priority and non-priority

#### Priority level \* Breastfeeding at birth combined total Crosstabulation

		Breastfeeding at birth combined total			
			Not breastfeeding	Breastfeeding	Total
Priority level	High priority	Count	16	325	341
		Expected Count	148.5	192.5	341.0
		% within Priority level	4.7%	95.3%	100.0%
	Low priority	Count	1153	1191	2344
		Expected Count	1020.5	1323.5	2344.0
		% within Priority level	49.2%	50.8%	100.0%
Total		Count	1169	1516	2685
		Expected Count	1169.0	1516.0	2685.0
		% within Priority level	43.5%	56.5%	100.0%

#### Breastfeeding at birth combined total Chi-Square Tests

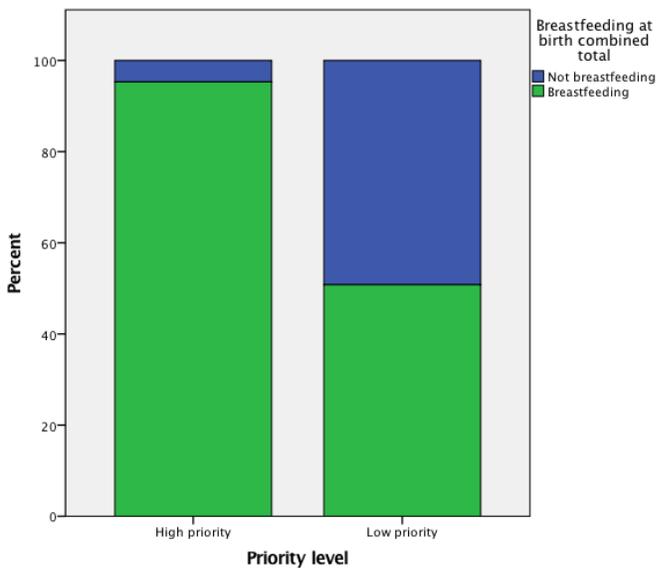
	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	239.779 <sup>a</sup>	1	.000		
Continuity Correction <sup>b</sup>	237.972	1	.000		
Likelihood Ratio	299.237	1	.000		
Fisher's Exact Test				.000	.000
N of Valid Cases	2685				

- a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 148.47.
- b. Computed only for a 2x2 table

### Breastfeeding at birth combined total Symmetric Measures

		Value	Approximate Significance
Nominal by Nominal	Phi	-.299	.000
	Cramer's V	.299	.000
N of Valid Cases		2685	

### Breastfeeding at birth combined total



**Priority level \* Breastfeeding at 6 months combined total  
Crosstabulation**

		Breastfeeding at 6 months combined total			
		Not breastfeeding	Yes breastfeeding	Total	
Priority level	High priority	Count	163	162	325
		Expected Count	105.7	219.3	325.0
		% within Priority level	50.2%	49.8%	100.0%
	Low priority	Count	330	861	1191
		Expected Count	387.3	803.7	1191.0
		% within Priority level	27.7%	72.3%	100.0%
Total		Count	493	1023	1516
		Expected Count	493.0	1023.0	1516.0
		% within Priority level	32.5%	67.5%	100.0%

**Breastfeeding at 6 months combined total  
Chi-Square Tests**

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	58.621 <sup>a</sup>	1	.000		
Continuity Correction <sup>b</sup>	57.602	1	.000		
Likelihood Ratio	56.027	1	.000		
Fisher's Exact Test				.000	.000
N of Valid Cases	1516				

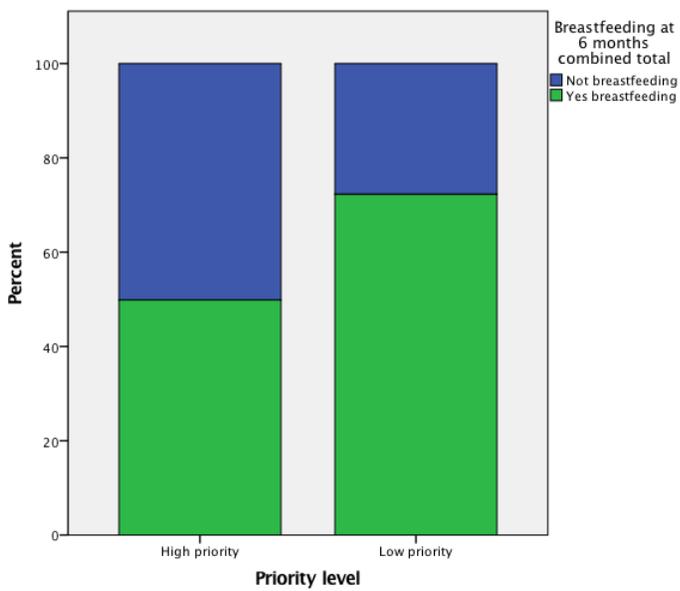
a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 105.69.

b. Computed only for a 2x2 table

## Breastfeeding at 6 months combined total Symmetric Measures

		Value	Approximate Significance
Nominal by Nominal	Phi	.197	.000
	Cramer's V	.197	.000
N of Valid Cases		1516	

## Breastfeeding at 6 months combined total



**Priority level \* Breastfeeding at 12 months combined total  
Crosstabulation**

		Breastfeeding at 12 months combined total		Total	
		Not breastfeeding	Yes breastfeeding		
Priority level	High priority	Count	245	80	325
		Expected Count	232.6	92.4	325.0
		% within Priority level	75.4%	24.6%	100.0%
	Low priority	Count	840	351	1191
		Expected Count	852.4	338.6	1191.0
		% within Priority level	70.5%	29.5%	100.0%
Total		Count	1085	431	1516
		Expected Count	1085.0	431.0	1516.0
		% within Priority level	71.6%	28.4%	100.0%

**Breastfeeding at 12 months combined total  
Chi-Square Tests**

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	2.959 <sup>a</sup>	1	.085		
Continuity Correction <sup>b</sup>	2.725	1	.099		
Likelihood Ratio	3.022	1	.082		
Fisher's Exact Test				.096	.048
N of Valid Cases	1516				

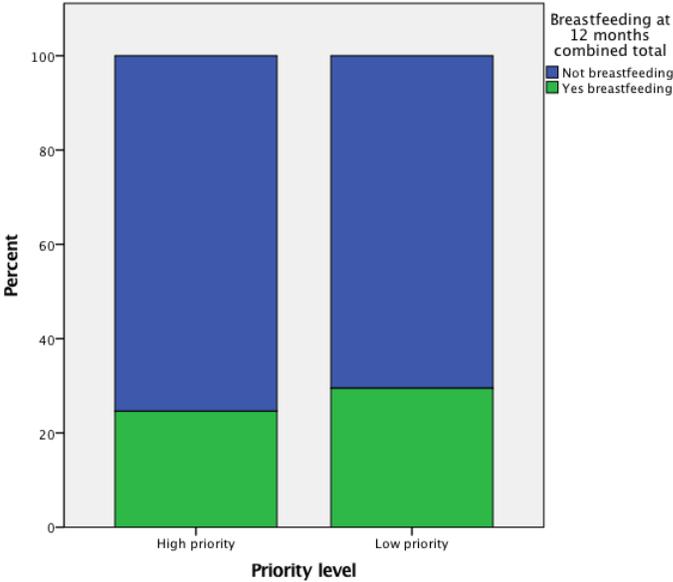
a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 92.40.

b. Computed only for a 2x2 table

### Breastfeeding at 12 months combined total Symmetric Measures

		Value	Approximate Significance
Nominal by Nominal	Phi	.044	.085
	Cramer's V	.044	.085
N of Valid Cases		1516	

### Breastfeeding at 12 months combined total



**Priority level \* Breastfeeding at 18 months combined total  
Crosstabulation**

		Breastfeeding at 18 months combined total		Total	
		Not breastfeeding	Yes breastfeeding		
Priority level	High priority	Count	293	32	325
		Expected Count	289.0	36.0	325.0
		% within Priority level	90.2%	9.8%	100.0%
	Low priority	Count	1055	136	1191
		Expected Count	1059.0	132.0	1191.0
		% within Priority level	88.6%	11.4%	100.0%
Total		Count	1348	168	1516
		Expected Count	1348.0	168.0	1516.0
		% within Priority level	88.9%	11.1%	100.0%

**Breastfeeding at 18 months combined total  
Chi-Square Tests**

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.641 <sup>a</sup>	1	.423		
Continuity Correction <sup>b</sup>	.491	1	.483		
Likelihood Ratio	.657	1	.418		
Fisher's Exact Test				.485	.244
N of Valid Cases	1516				

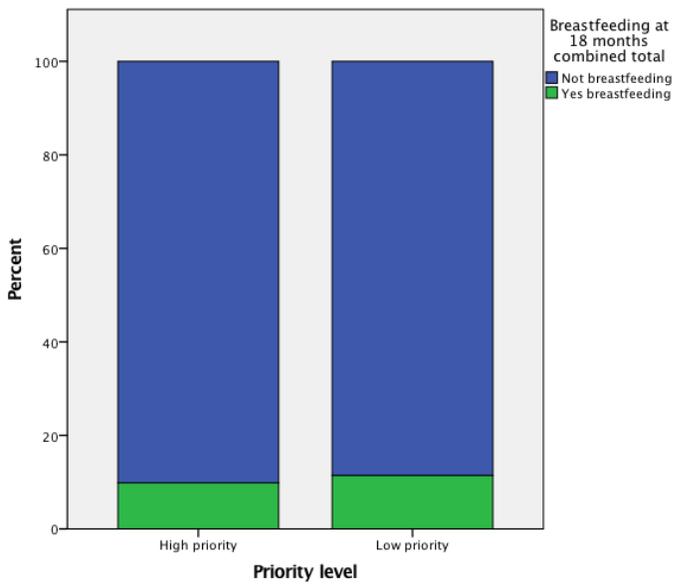
a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 36.02.

b. Computed only for a 2x2 table

## Breastfeeding at 18 months combined total Symmetric Measures

		Value	Approximate Significance
Nominal by	Phi	.021	.423
Nominal	Cramer's V	.021	.423
N of Valid Cases		1516	

## Breastfeeding at 18 months combined total



**Priority level \* Household tobacco use at 18 months  
combined total Crosstabulation**

		Household tobacco use at 18 months combined total		Total	
		No household tobacco use	Yes - household tobacco use		
Priority level	High priority	Count	219	106	325
		Expected Count	217.4	107.6	325.0
		% within Priority level	67.4%	32.6%	100.0%
	Low priority	Count	795	396	1191
		Expected Count	796.6	394.4	1191.0
		% within Priority level	66.8%	33.2%	100.0%
Total		Count	1014	502	1516
		Expected Count	1014.0	502.0	1516.0
		% within Priority level	66.9%	33.1%	100.0%

**Household tobacco use at 18 months  
Chi-Square Tests**

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.046 <sup>a</sup>	1	.830		
Continuity Correction <sup>b</sup>	.022	1	.882		
Likelihood Ratio	.046	1	.829		
Fisher's Exact Test				.842	.443
N of Valid Cases	1516				

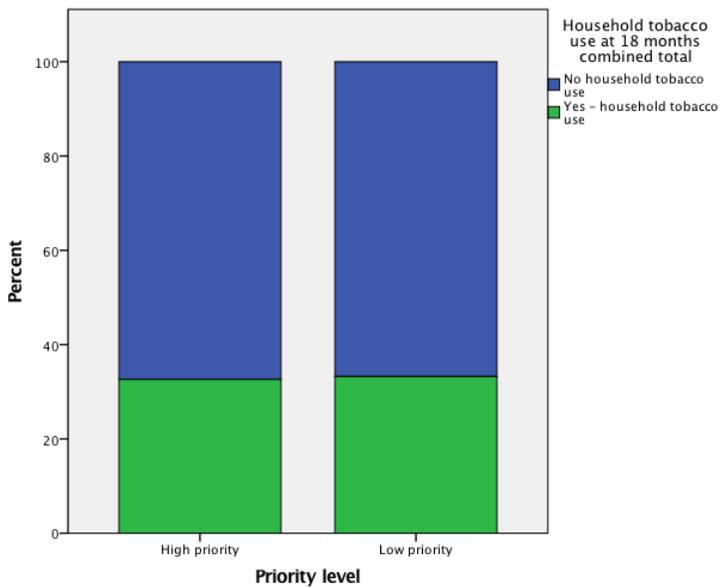
a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 107.62.

b. Computed only for a 2x2 table

## Household tobacco use at 18 months Symmetric Measures

		Value	Approximate Significance
Nominal by Nominal	Phi	.006	.830
	Cramer's V	.006	.830
N of Valid Cases		1516	

## Household tobacco use at 18 months



**Priority level \* Immunizations at 18 months combined total  
Crosstabulation**

		Immunizations at 18 months combined total			
			Immunizations incomplete	Immunizations complete	Total
Priority level	High priority	Count	68	287	355
		Expected Count	80.1	274.9	355.0
		% within Priority level	19.2%	80.8%	100.0%
	Low priority	Count	560	1870	2430
		Expected Count	547.9	1882.1	2430.0
		% within Priority level	23.0%	77.0%	100.0%
Total		Count	628	2157	2785
		Expected Count	628.0	2157.0	2785.0
		% within Priority level	22.5%	77.5%	100.0%

**Immunizations at 18 months combined total  
Chi-Square Tests**

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	2.684 <sup>a</sup>	1	.101		
Continuity Correction <sup>b</sup>	2.466	1	.116		
Likelihood Ratio	2.774	1	.096		
Fisher's Exact Test				.103	.056
N of Valid Cases	2785				

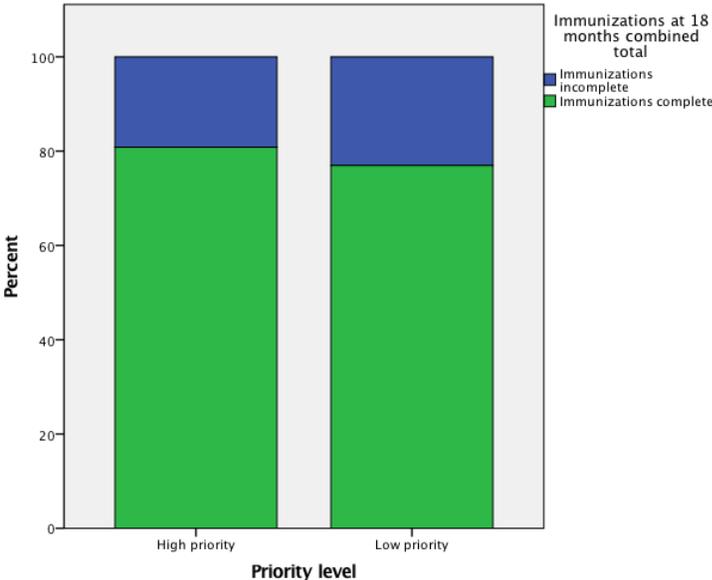
a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 80.05.

b. Computed only for a 2x2 table

## Immunizations at 18 months combined total Symmetric Measures

		Value	Approximate Significance
Nominal by Nominal	Phi	-.031	.101
	Cramer's V	.031	.101
N of Valid Cases		2785	

## Immunizations at 18 months combined total



### III Individual results for each area

#### Area 71

#### Priority level \* Area 71 Breastfeeding at birth Crosstabulation

		Area 71 Breastfeeding at birth		Total	
		no	yes		
Priority level	high	Count	1	115	116
		Expected Count	49.0	67.0	116.0
		% within Priority level	0.9%	99.1%	100.0%
	low	Count	401	434	835
		Expected Count	353.0	482.0	835.0
		% within Priority level	48.0%	52.0%	100.0%
Total	Count	402	549	951	
	Expected Count	402.0	549.0	951.0	
	% within Priority level	42.3%	57.7%	100.0%	

#### Area 71 Breastfeeding at birth Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	92.834 <sup>a</sup>	1	.000		
Continuity Correction <sup>b</sup>	90.912	1	.000		
Likelihood Ratio	127.802	1	.000		
Fisher's Exact Test				.000	.000
N of Valid Cases	951				

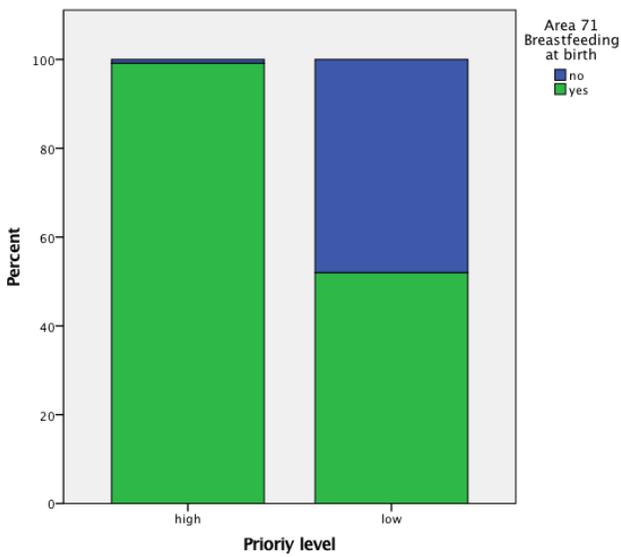
a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 49.03.

b. Computed only for a 2x2 table

## Area 71 Breastfeeding at birth Symmetric Measures

		Value	Approximate Significance
Nominal by Nominal	Phi	-.312	.000
	Cramer's V	.312	.000
N of Valid Cases		951	

## Area 71 Breastfeeding at birth



**Area 71 Priority level \* Area 71 Bfg6mo  
Crosstabulation**

		Area 71 Bfg6mo		Total	
		no	yes		
Priority level	high	Count	48	67	115
		Expected Count	14.7	100.3	115.0
		% within Priority level	41.7%	58.3%	100.0%
	low	Count	22	412	434
		Expected Count	55.3	378.7	434.0
		% within Priority level	5.1%	94.9%	100.0%
Total		Count	70	479	549
		Expected Count	70.0	479.0	549.0
		% within Priority level	12.8%	87.2%	100.0%

**Area 71 Breastfeeding at 6 months  
Chi-Square Tests**

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	109.888 <sup>a</sup>	1	.000		
Continuity Correction <sup>b</sup>	106.616	1	.000		
Likelihood Ratio	88.670	1	.000		
Fisher's Exact Test				.000	.000
N of Valid Cases	549				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 14.66.

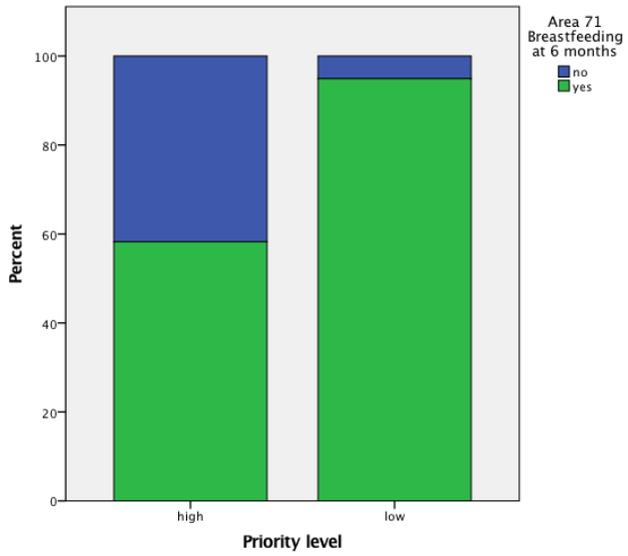
b. Computed only for a 2x2 table

**Area 71 Breastfeeding at 6 months  
Symmetric Measures**

	Value	Approximate Significance
Phi	.447	.000

Nominal by Nominal	Cramer's V	.447	.000
N of Valid Cases		549	

## Area 71 Breastfeeding at 6 months



### AREA 71 Level of priority \* Breastfeeding at 12 months Crosstabulation

			Breastfeeding at 12 months		Total
			no	yes	
Level of priority	high	Count	78	37	115
		Expected Count	79.4	35.6	115.0
		% within Level of priority	67.8%	32.2%	100.0%
	low	Count	301	133	434
		Expected Count	299.6	134.4	434.0
		% within Level of priority	69.4%	30.6%	100.0%
Total	Count	379	170	549	
	Expected Count	379.0	170.0	549.0	
	% within Level of priority	69.0%	31.0%	100.0%	

### AREA 71 Breastfeeding at 12+ months Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.099 <sup>a</sup>	1	.753		
Continuity Correction <sup>b</sup>	.041	1	.840		
Likelihood Ratio	.099	1	.753		
Fisher's Exact Test				.821	.417
N of Valid Cases	549				

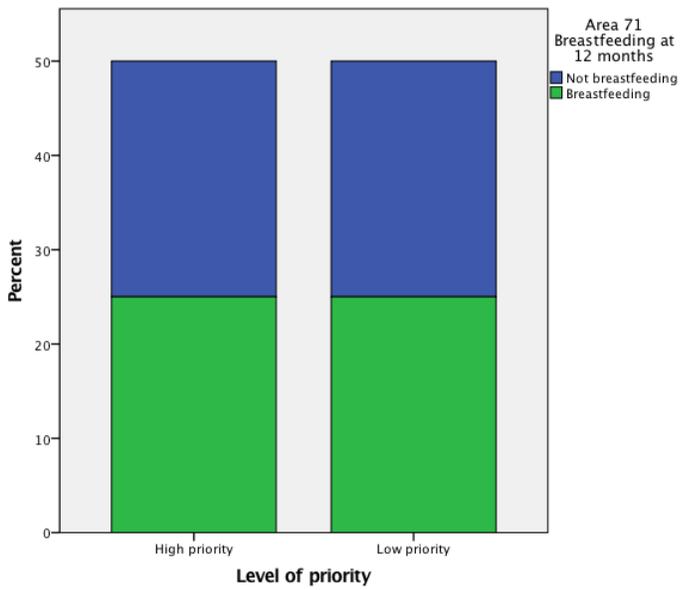
a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 35.61.

b. Computed only for a 2x2 table

## AREA 71 Breastfeeding at 12+ months Symmetric Measures

		Value	Approximate Significance
Nominal by	Phi	-.013	.753
Nominal	Cramer's V	.013	.753
N of Valid Cases		549	

## AREA 71 Breastfeeding at 12+ months



**AREA 71 Level of priority \* Breastfeeding at 18+ months  
Crosstabulation**

		Breastfeeding at 18 months		Total	
		no	yes		
Level of priority	high	Count	99	16	115
		Expected Count	99.9	15.1	115.0
		% within Level of priority	86.1%	13.9%	100.0%
	low	Count	378	56	434
		Expected Count	377.1	56.9	434.0
		% within Level of priority	87.1%	12.9%	100.0%
Total		Count	477	72	549
		Expected Count	477.0	72.0	549.0
		% within Level of priority	86.9%	13.1%	100.0%

**AREA 71 Breastfeeding at 18 months  
Chi-Square Tests**

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.081 <sup>a</sup>	1	.775		
Continuity Correction <sup>b</sup>	.017	1	.897		
Likelihood Ratio	.080	1	.777		
Fisher's Exact Test				.758	.440
N of Valid Cases	549				

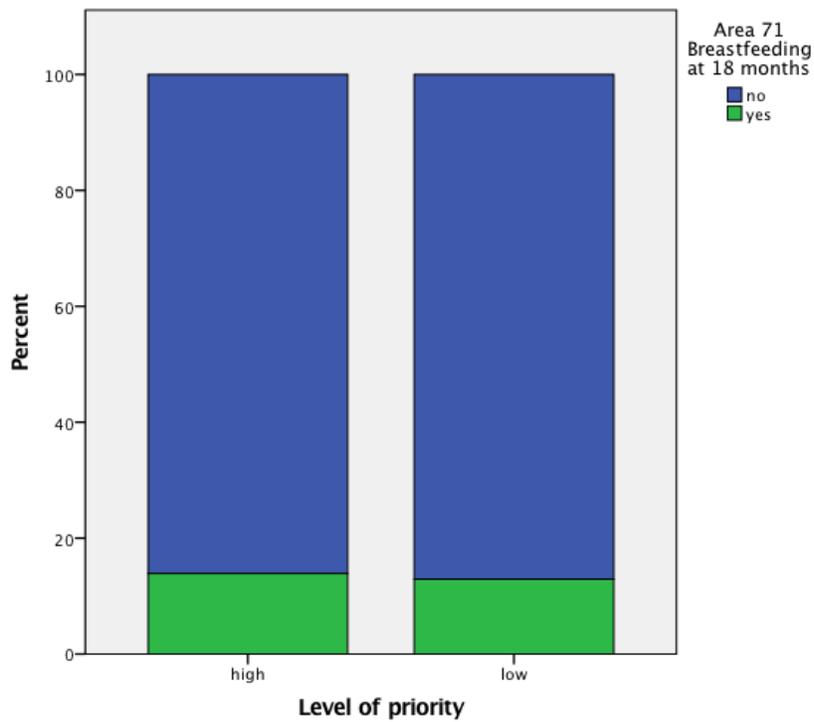
a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 15.08.

b. Computed only for a 2x2 table

## AREA 71 Breastfeeding at 18 months Symmetric Measures

		Value	Approximate Significance
Nominal by	Phi	-.012	.775
Nominal	Cramer's V	.012	.775
N of Valid Cases		549	

## AREA 71 Breastfeeding at 18 months



**AREA 71 Priority level \* Household tobacco use at 18+ months Crosstabulation**

			Household tobacco use at 18+ months		Total
			no	yes	
Priority level	high	Count	63	53	116
		Expected Count	89.4	26.6	116.0
		% within Priority level	54.3%	45.7%	100.0%
	low	Count	670	165	835
		Expected Count	643.6	191.4	835.0
		% within Priority level	80.2%	19.8%	100.0%
Total		Count	733	218	951
		Expected Count	733.0	218.0	951.0
		% within Priority level	77.1%	22.9%	100.0%

**AREA 71 Household Tobacco Use at 18 months Chi-Square Tests**

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	38.756 <sup>a</sup>	1	.000		
Continuity Correction <sup>b</sup>	37.303	1	.000		
Likelihood Ratio	33.892	1	.000		
Fisher's Exact Test				.000	.000
N of Valid Cases	951				

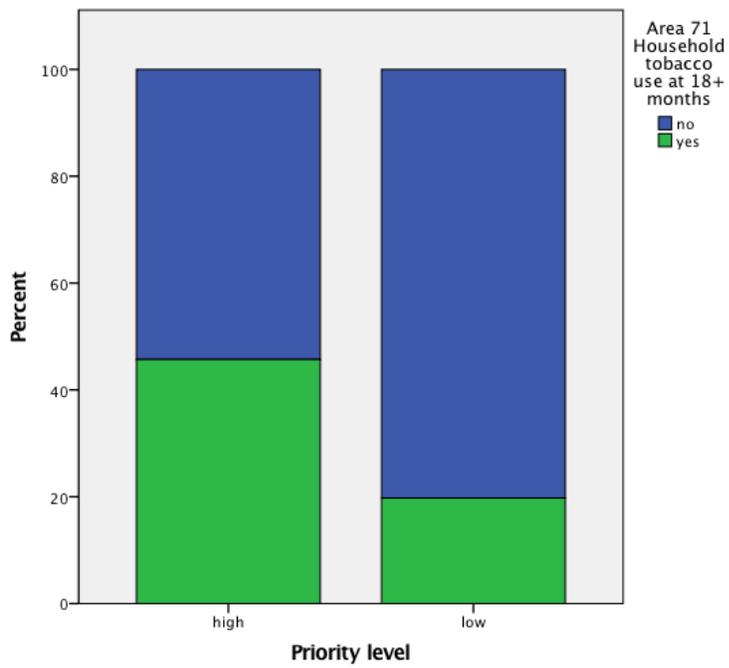
a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 26.59.

b. Computed only for a 2x2 table

**AREA 71 Household Tobacco Use at 18 months Symmetric Measures**

		Value	Approximate Significance
Nominal by Nominal	Phi	-.202	.000
	Cramer's V	.202	.000
N of Valid Cases		951	

## AREA 71 Household Tobacco Use at 18 months



### AREA 71 Priority level \* Completed Immunizations at 18+ months Crosstabulation

		Completed Immunizations at 18+ months		Total	
		no	yes		
Priority level	high	Count	16	103	119
		Expected Count	32.9	86.1	119.0
		% within Priority level	13.4%	86.6%	100.0%
	low	Count	258	615	873
		Expected Count	241.1	631.9	873.0
		% within Priority level	29.6%	70.4%	100.0%
Total		Count	274	718	992
		Expected Count	274.0	718.0	992.0
		% within Priority level	27.6%	72.4%	100.0%

### AREA 71 Completed Immunizations at 18 months Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	13.592 <sup>a</sup>	1	.000		
Continuity Correction <sup>b</sup>	12.798	1	.000		
Likelihood Ratio	15.415	1	.000		
Fisher's Exact Test				.000	.000
N of Valid Cases	992				

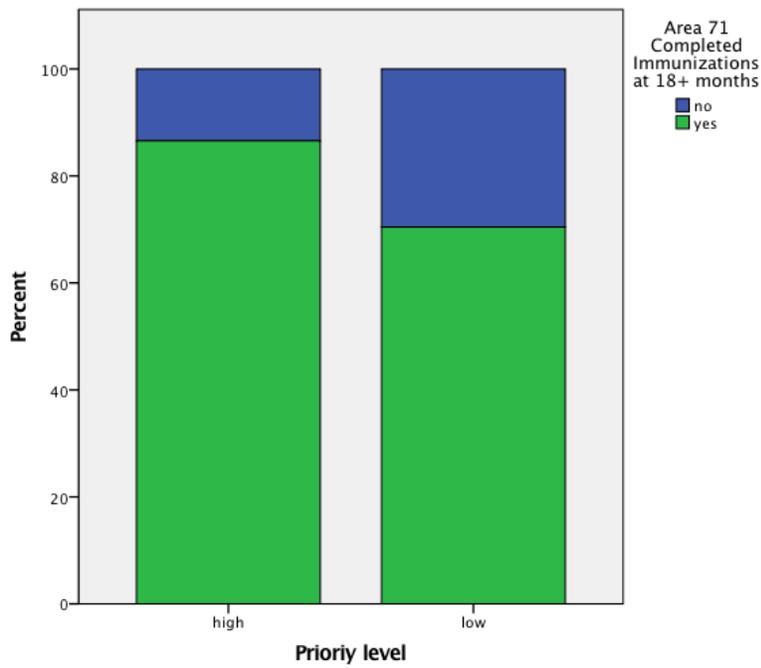
a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 32.87.

b. Computed only for a 2x2 table

## AREA 71 Completed Immunizations at 18 months Symmetric Measures

		Value	Approximate Significance
Nominal by Nominal	Phi	-.117	.000
	Cramer's V	.117	.000
N of Valid Cases		992	

## AREA 71 Completed Immunizations at 18 months



## Area 65

**Priority level \* Area 65 Breastfeeding at birth  
Crosstabulation**

		Area 65 Breastfeeding at birth		Total	
		no	yes		
Priority level	high	Count	7	74	81
		Expected Count	41.2	39.8	81.0
		% within Priority level	8.6%	91.4%	100.0%
	low	Count	242	167	409
		Expected Count	207.8	201.2	409.0
		% within Priority level	59.2%	40.8%	100.0%
Total		Count	249	241	490
		Expected Count	249.0	241.0	490.0
		% within Priority level	50.8%	49.2%	100.0%

**Area 65 Breastfeeding at birth  
Chi-Square Tests**

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	69.061 <sup>a</sup>	1	.000		
Continuity Correction <sup>b</sup>	67.054	1	.000		
Likelihood Ratio	78.334	1	.000		
Fisher's Exact Test				.000	.000
N of Valid Cases	490				

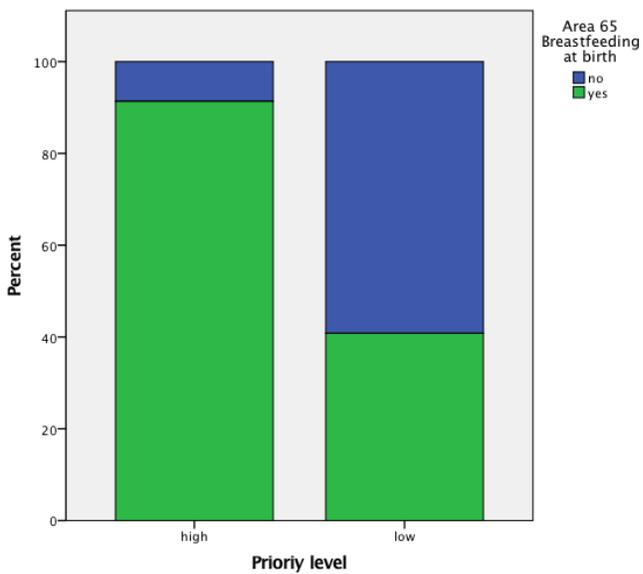
a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 39.84.

b. Computed only for a 2x2 table

## Area 65 Breastfeeding at birth Symmetric Measures

		Value	Approximate Significance
Nominal by	Phi	-.375	.000
Nominal	Cramer's V	.375	.000
N of Valid Cases		490	

## Area 65 Breastfeeding at birth



**Area 65 Priority level \* Area 65Bfg6mo  
Crosstabulation**

		Area 65 Bfg6mo		Total	
		no	yes		
Priority level	high	Count	33	41	74
		Expected Count	10.1	63.9	74.0
		% within Priority level	44.6%	55.4%	100.0%
	low	Count	0	167	167
		Expected Count	22.9	144.1	167.0
		% within Priority level	0.0%	100.0%	100.0%
Total		Count	33	208	241
		Expected Count	33.0	208.0	241.0
		% within Priority level	13.7%	86.3%	100.0%

**Area 65 Breastfeeding at 6 months  
Chi-Square Tests**

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	86.288 <sup>a</sup>	1	.000		
Continuity Correction <sup>b</sup>	82.556	1	.000		
Likelihood Ratio	90.768	1	.000		
Fisher's Exact Test				.000	.000
N of Valid Cases	241				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 10.13.

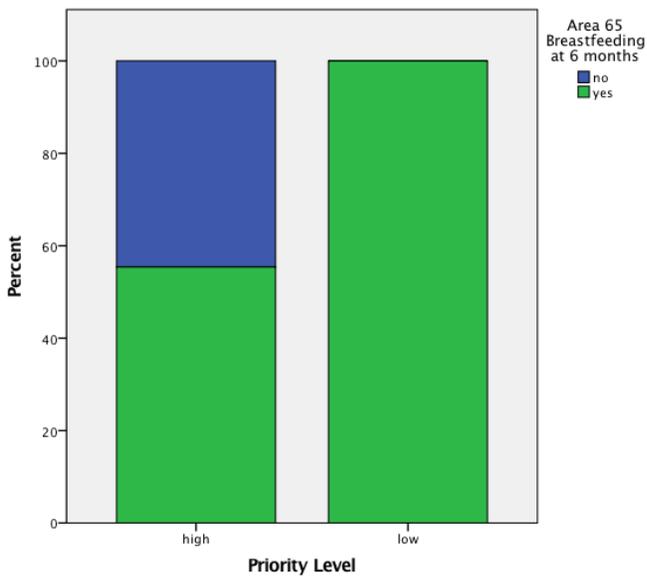
b. Computed only for a 2x2 table

**Area 65 Breastfeeding at 6 months  
Symmetric Measures**

Value	Approximate Significance

Nominal by	Phi	.598	.000
Nominal	Cramer's V	.598	.000
N of Valid Cases		241	

## Area 65 Breastfeeding at 6 months



### Priority level \* Area 65 Bfg12+mo Crosstabulation

		Area 65 Bfg12mo		Total	
		no	yes		
Priority level	high	Count	53	21	74
		Expected Count	37.8	36.2	74.0
		% within Priority level	71.6%	28.4%	100.0%
	low	Count	70	97	167
		Expected Count	85.2	81.8	167.0
		% within Priority level	41.9%	58.1%	100.0%
Total	Count	123	118	241	
	Expected Count	123.0	118.0	241.0	
	% within Priority level	51.0%	49.0%	100.0%	

### Area 65 Chi-Square Tests for Breastfeeding at 12+ months

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	18.107 <sup>a</sup>	1	.000		
Continuity Correction <sup>b</sup>	16.938	1	.000		
Likelihood Ratio	18.586	1	.000		
Fisher's Exact Test				.000	.000
N of Valid Cases	241				

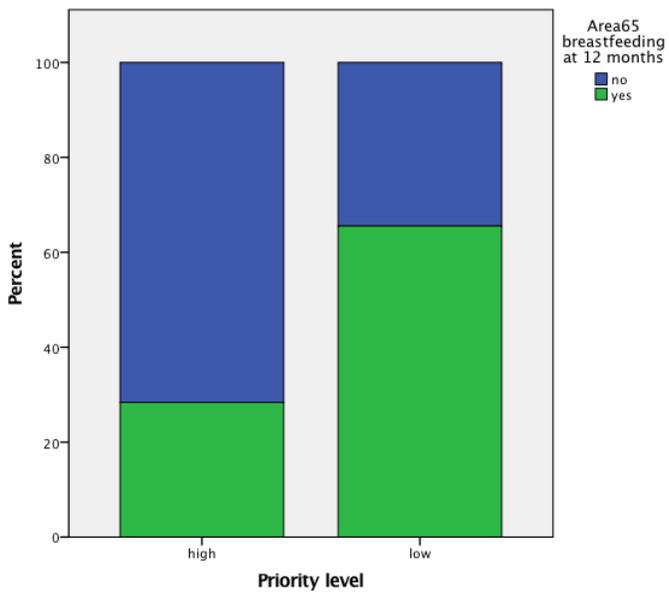
a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 36.23.

b. Computed only for a 2x2 table

## Area 65 Symmetric Measures for Breastfeeding at 12+ months

		Value	Approximate Significance
Nominal by	Phi	.274	.000
Nominal	Cramer's V	.274	.000
N of Valid Cases		241	

## Area 65 Breastfeeding at 12+ months



## Area 65 Priority level \* Breastfeeding at 18+ months Crosstabulation

			Breastfeeding at 18+ months		Total
			no	yes	
Priority level	high	Count	62	12	74
		Expected Count	56.2	17.8	74.0
		% within Priority level	83.8%	16.2%	100.0%
	low	Count	121	46	167
		Expected Count	126.8	40.2	167.0
		% within Priority level	72.5%	27.5%	100.0%
Total		Count	183	58	241
		Expected Count	183.0	58.0	241.0
		% within Priority level	75.9%	24.1%	100.0%

## Area 65 Chi-Square Tests for Breastfeeding at 18+ months

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	3.601 <sup>a</sup>	1	.058		
Continuity Correction <sup>b</sup>	3.008	1	.083		
Likelihood Ratio	3.796	1	.051		
Fisher's Exact Test				.072	.039
N of Valid Cases	241				

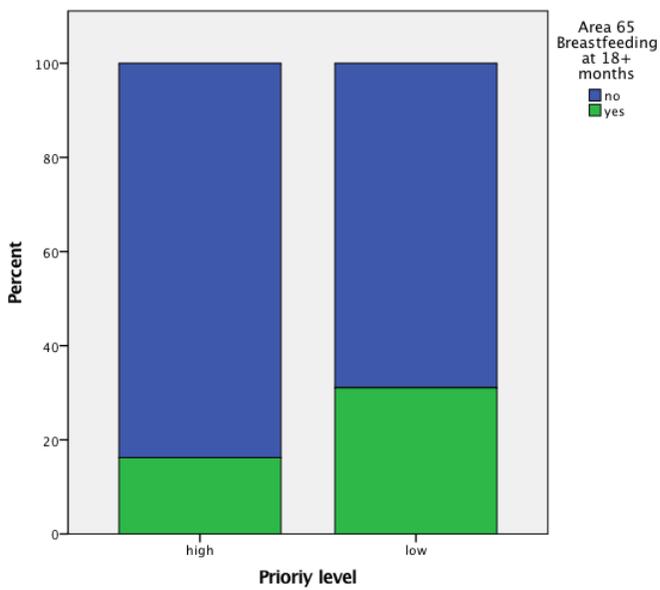
a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 17.81.

b. Computed only for a 2x2 table

## Area 65 Symmetric Measures for Breastfeeding at 18+ months

		Value	Approximate Significance
Nominal by	Phi	.122	.058
Nominal	Cramer's V	.122	.058
N of Valid Cases		241	

### Area 65 Breastfeeding at 18+ months



## AREA 65 Priority level \* Household Tobacco Use at 18 months Crosstabulation

			Household tobacco use at 18 months		Total
			no	yes	
Priority level	high	Count	32	49	81
		Expected Count	40.8	40.2	81.0
		% within Priority level	39.5%	60.5%	100.0%
	low	Count	215	194	409
		Expected Count	206.2	202.8	409.0
		% within Priority level	52.6%	47.4%	100.0%
Total	Count	247	243	490	
	Expected Count	247.0	243.0	490.0	
	% within Priority level	50.4%	49.6%	100.0%	

**AREA 65 Household Tobacco Use at 18 months  
Chi-Square Tests**

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	4.614 <sup>a</sup>	1	.032		
Continuity Correction <sup>b</sup>	4.106	1	.043		
Likelihood Ratio	4.641	1	.031		
Fisher's Exact Test				.038	.021
N of Valid Cases	490				

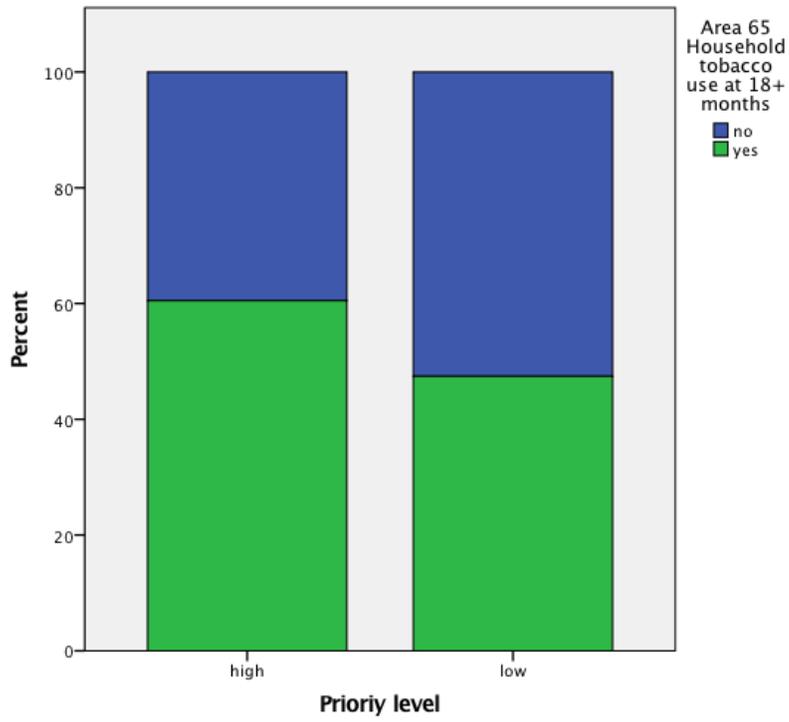
a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 40.17.

b. Computed only for a 2x2 table

**AREA 65 Household Tobacco Use at 18 months  
Symmetric Measures**

		Value	Approximate Significance
Nominal by Nominal	Phi	-.097	.032
	Cramer's V	.097	.032
N of Valid Cases		490	

# AREA 65 Household Tobacco Use at 18 months



## AREA 65 Priority level \* Completed Immunizations at 18+ months Crosstabulation

		Completed Immunizations at 18+ months		Total	
		no	yes		
Priority level	high	Count	28	58	86
		Expected Count	24.5	61.5	86.0
		% within Priority level	32.6%	67.4%	100.0%
	low	Count	117	305	422
		Expected Count	120.5	301.5	422.0
		% within Priority level	27.7%	72.3%	100.0%
Total		Count	145	363	508
		Expected Count	145.0	363.0	508.0
		% within Priority level	28.5%	71.5%	100.0%

## AREA 65 Completed Immunizations at 18 months Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2- sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.818 <sup>a</sup>	1	.366		
Continuity Correction <sup>b</sup>	.598	1	.439		
Likelihood Ratio	.801	1	.371		
Fisher's Exact Test				.362	.218
N of Valid Cases	508				

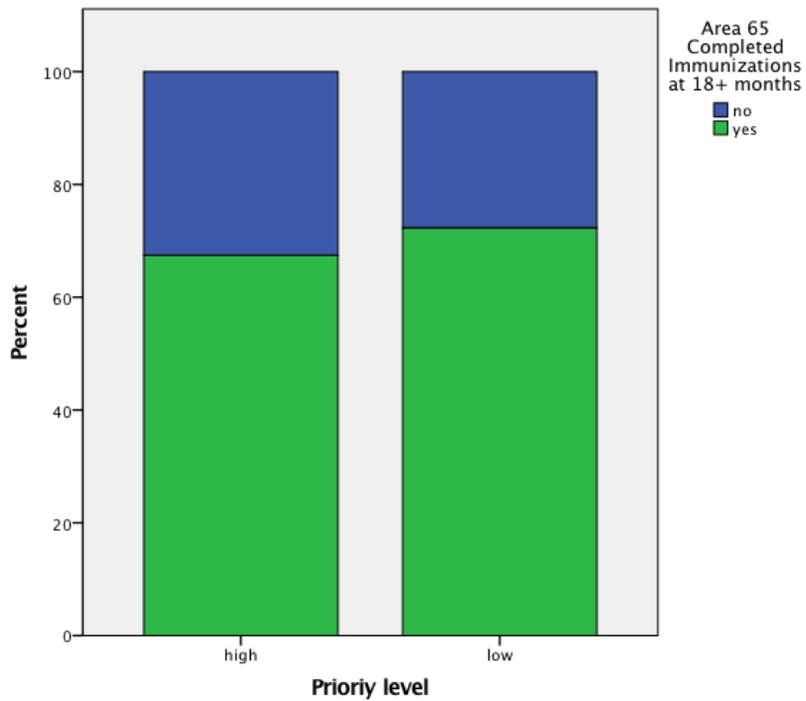
a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 24.55.

b. Computed only for a 2x2 table

## AREA 65 Completed Immunizations at 18 months Symmetric Measures

		Value	Approximate Significance
Nominal by	Phi	.040	.366
Nominal	Cramer's V	.040	.366
N of Valid Cases		508	

## AREA 65 Completed Immunizations at 18 months



## Area 62

### Area 62 Priority level \* Breastfeeding at birth Crosstabulation

			Breastfeeding at birth		Total
			no	yes	
Priority level	high	Count	8	136	144
		Expected Count	60.0	84.0	144.0
		% within Priority level	5.6%	94.4%	100.0%
	low	Count	510	590	1100
		Expected Count	458.0	642.0	1100.0
		% within Priority level	46.4%	53.6%	100.0%
Total		Count	518	726	1244
		Expected Count	518.0	726.0	1244.0
		% within Priority level	41.6%	58.4%	100.0%

### Area 62 Breastfeeding at birth Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	87.257 <sup>a</sup>	1	.000		
Continuity Correction <sup>b</sup>	85.586	1	.000		
Likelihood Ratio	108.715	1	.000		
Fisher's Exact Test				.000	.000
N of Valid Cases	1244				

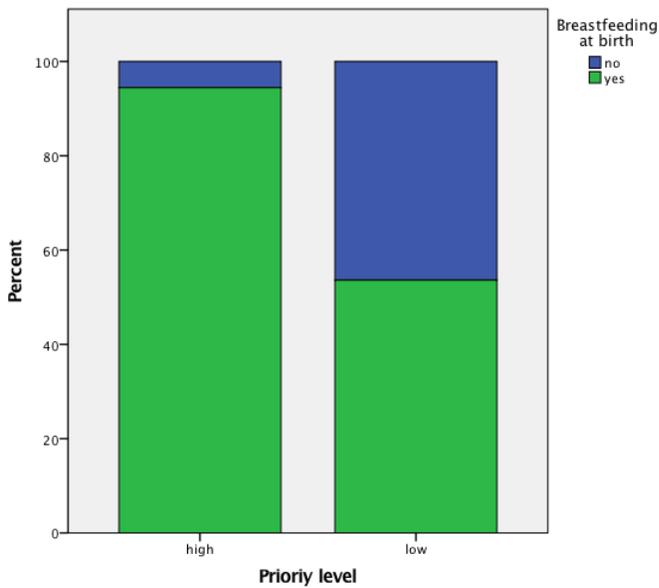
a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 59.96.

b. Computed only for a 2x2 table

## Area 62 Breastfeeding at birth Symmetric Measures

		Value	Approximate Significance
Nominal by	Phi	-.265	.000
Nominal	Cramer's V	.265	.000
N of Valid Cases		1244	

### Area 62 Breastfeeding at birth



### Area 62 Priority level \* Breastfeeding at 6 mo. Crosstabulation

		Breastfeeding at 6 mo.		Total	
		no	yes		
Priority level	high	Count	82	54	136
		Expected Count	73.1	62.9	136.0
		% within Priority level	60.3%	39.7%	100.0%
	low	Count	308	282	590
		Expected Count	316.9	273.1	590.0
		% within Priority level	52.2%	47.8%	100.0%
Total	Count	390	336	726	
	Expected Count	390.0	336.0	726.0	
	% within Priority level	53.7%	46.3%	100.0%	

### Area 62 Breastfeeding at 6 months Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	2.910 <sup>a</sup>	1	.088		
Continuity Correction <sup>b</sup>	2.594	1	.107		
Likelihood Ratio	2.932	1	.087		
Fisher's Exact Test				.105	.053
N of Valid Cases	726				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 62.94.

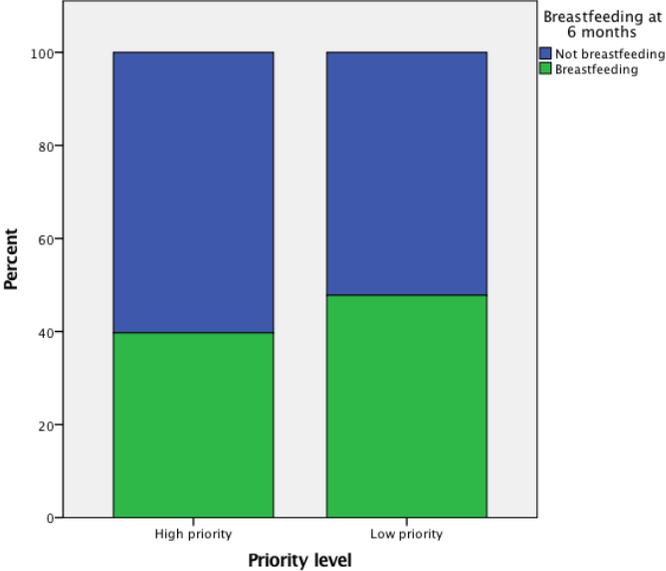
b. Computed only for a 2x2 table

### Area 62 Breastfeeding at 6 months Symmetric Measures

	Value	Approximate Significance

Nominal by	Phi	.063	.088
Nominal	Cramer's V	.063	.088
N of Valid Cases		726	

### Area 62 Breastfeeding at 6 months



**AREA 62 Priority level \* Breastfeeding at 12+ mo.  
Crosstabulation**

		Breastfeeding at 12 mo.		Total	
		no	yes		
Priority level	high	Count	114	22	136
		Expected Count	109.2	26.8	136.0
		% within Priority level	83.8%	16.2%	100.0%
	low	Count	469	121	590
		Expected Count	473.8	116.2	590.0
		% within Priority level	79.5%	20.5%	100.0%
Total		Count	583	143	726
		Expected Count	583.0	143.0	726.0
		% within Priority level	80.3%	19.7%	100.0%

**AREA 62 Breastfeeding at 12+ months  
Chi-Square Tests**

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	1.311 <sup>a</sup>	1	.252		
Continuity Correction <sup>b</sup>	1.052	1	.305		
Likelihood Ratio	1.362	1	.243		
Fisher's Exact Test				.283	.152
N of Valid Cases	726				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 26.79.

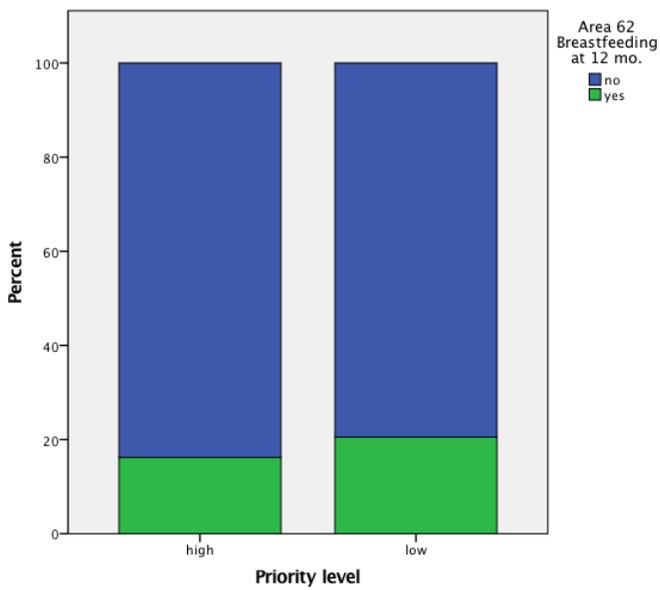
b. Computed only for a 2x2 table

**AREA 62 Breastfeeding at 12+ months  
Symmetric Measures**

Value	Approximate Significance

Nominal by	Phi	.042	.252
Nominal	Cramer's V	.042	.252
N of Valid Cases		726	

## AREA 62 Breastfeeding at 12+ months



## AREA 62 Priority level \* Breastfeeding at 18+ months Crosstabulation

			Breastfeeding at 18+ months		Total
			no	yes	
Priority level	high	Count	132	4	136
		Expected Count	128.9	7.1	136.0
		% within Priority level	97.1%	2.9%	100.0%
	low	Count	556	34	590
		Expected Count	559.1	30.9	590.0
		% within Priority level	94.2%	5.8%	100.0%
Total		Count	688	38	726
		Expected Count	688.0	38.0	726.0
		% within Priority level	94.8%	5.2%	100.0%

## AREA 62 Breastfeeding at 18 months Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	1.774 <sup>a</sup>	1	.183		
Continuity Correction <sup>b</sup>	1.251	1	.263		
Likelihood Ratio	2.023	1	.155		
Fisher's Exact Test				.283	.129
N of Valid Cases	726				

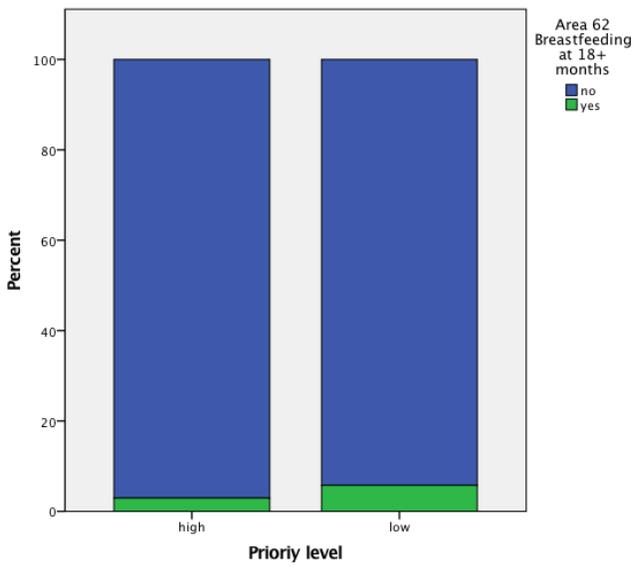
a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 7.12.

b. Computed only for a 2x2 table

## AREA 62 Breastfeeding at 18 months Symmetric Measures

		Value	Approximate Significance
Nominal by Nominal	Phi	.049	.183
	Cramer's V	.049	.183
N of Valid Cases		726	

## AREA 62 Breastfeeding at 18 months



### AREA 62 Level of priority \* Household tobacco at 18 months Crosstabulation

			Household tobacco at 18 months		Total
			no	yes	
Level of priority	high	Count	140	4	144
		Expected Count	139.3	4.7	144.0
		% within Level of priority	97.2%	2.8%	100.0%
	low	Count	1063	37	1100
		Expected Count	1063.7	36.3	1100.0
		% within Level of priority	96.6%	3.4%	100.0%
Total	Count	1203	41	1244	
	Expected Count	1203.0	41.0	1244.0	
	% within Level of priority	96.7%	3.3%	100.0%	

### AREA 62 Household Tobacco Use at 18 months Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.137 <sup>a</sup>	1	.711		
Continuity Correction <sup>b</sup>	.015	1	.903		
Likelihood Ratio	.144	1	.705		
Fisher's Exact Test				1.000	.476
N of Valid Cases	1244				

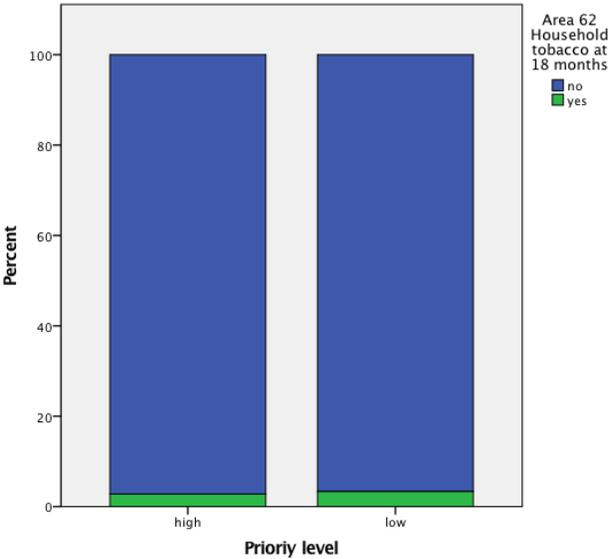
a. 1 cells (25.0%) have expected count less than 5. The minimum expected count is 4.75.

b. Computed only for a 2x2 table

## AREA 62 Household Tobacco Use at 18 months Symmetric Measures

		Value	Approximate Significance
Nominal by	Phi	.010	.711
Nominal	Cramer's V	.010	.711
N of Valid Cases		1244	

## AREA 62 Household Tobacco Use at 18 months



## AREA 62 Priority level \* Completed Immunizations at 18+ months Crosstabulation

		Completed Immunizations at 18+ months			
			no	yes	Total
Priority level	high	Count	24	126	150
		Expected Count	24.4	125.6	150.0
		% within Priority level	16.0%	84.0%	100.0%
	low	Count	185	950	1135
		Expected Count	184.6	950.4	1135.0
		% within Priority level	16.3%	83.7%	100.0%
Total		Count	209	1076	1285
		Expected Count	209.0	1076.0	1285.0
		% within Priority level	16.3%	83.7%	100.0%

## AREA 62 Completed Immunizations at 18 months Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.009 <sup>a</sup>	1	.926		
Continuity Correction <sup>b</sup>	.000	1	1.000		
Likelihood Ratio	.009	1	.925		
Fisher's Exact Test				1.000	.518
N of Valid Cases	1285				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 24.40.

b. Computed only for a 2x2 table

## AREA 62 Completed Immunizations at 18 months Symmetric Measures

Value	Approximate Significance
-------	--------------------------

Nominal by	Phi	-.003	.926
Nominal	Cramer's V	.003	.926
N of Valid Cases		1285	

## AREA 62 Completed Immunizations at 18 months

